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THE disastrous rear collision of passenger trains which occurred at Batavia, N. Y., last January, and which was reported in the *Railway Age Gazette* of January 20 and February 24 is explained by the government bulletin, reprinted in the present issue, as due probably to the engineman, 54 years old, being unconscious from epilepsy for a period of about 10 minutes; and to the neglect of the fireman to observe the rule requiring him to speak to the engineman on approaching each block signal. This case brings up a number of difficult questions: Can firemen be trained to "call" signals to the engineman with sufficient regularity and faithfulness to make the "call" rule a real safeguard? Innumerable collisions have seemed to indicate that they cannot. This fireman had worked on passenger trains 10

months; are men who have thus served for 10 years more efficient than was this one? If they are, should not every fireman of fast passenger trains be required to have gone through a long term of severe discipline on slow trains? How can a superintendent assure himself of the physical fitness of enginemen? Will a doctor's examination once in five years be sufficient? Would an examination every six months, or even every six days, have prevented this collision? A large share of collisions like this result in the death of the engineman, leaving important questions unanswered and unanswerable, but in this case he escaped, so we have the advantage of the engineman's own version; and evidently he has a conscience. In the majority of rear collisions the engineman's conscience seems to be completely paralyzed. Can consciences be trained? This is a vital question, for it affects not only the problem of getting the facts of a collision after it has happened, but also that of getting enginemen (and others) to notify their boss when, because of ill-health, they, perhaps, ought not to be entrusted with a train. From the statement in holy writ (Psalm 15), the man who sweareth to his own hurt and changeth not is a pretty high-class man, but men of that kind are needed in train service, and it is idle to blink the fact that to get them it is necessary that the selection, the training and the subsequent sifting of those selected must be done according to the most exacting standards. As a final question—not to try to exhaust the subject in a single paragraph—we may ask, What is to be done if the answers to all of the others prove unfavorable? This engineman, like the one who caused a similar collision on the Lake Shore a year or so ago, had a clear record for many years. Is the automatic stop the only safeguard that will satisfy the public?

FROM time to time during the last two years we have called attention to the steady and rapid increase in the number of railway stockholders in the United States. The *Wall Street Journal* now takes up the subject of the general increase of stockholders of corporations, amplifies the figures to a great number of corporations of all kinds, and shows the increase for a significant period, the five years 1906-11. Out of its long list of varied corporations we extract the following table for twelve dividend paying railways:

	1911.	1906.
Southern Railway.....	10,485	9,119
Atchison	30,000	17,420
Southern Pacific.....	12,941	11,918
Union Pacific.....	19,862	17,791
Pennsylvania	66,520	40,153
Norfolk & Western.....	4,612	2,955
Del. Lack. & Western.....	1,709	1,500
N. Y. Central.....	20,486	9,766
St. Paul.....	9,780	5,887
New Haven.....	18,652	12,627
Baltimore & Ohio.....	10,887	6,880
Delaware & Hudson.....	6,370	3,571
Total	212,304	139,587

In the case of the Southern Pacific and the Union Pacific the returns are for the single year 1910-11, and if available for the five year period would make the difference in the totals considerably more impressive. But, taking the table as it stands, it shows a numerical increase of stockholders in the twelve roads during the last five years of 72,717, or somewhat more than 52 per cent. And the period itself is a significant one. It includes the panic and post-panic time that began in the October following the year 1906 and reached through 1908; a period of federal and state railway baiting not yet ended; and an epoch of mutations in gross and net earnings; all which theoretically should have shadowed railway investment and undoubtedly has had somewhat of that effect abroad where governmental policy toward particular interests counts for much in the investor's mind. In the remarkable increase some allowance must undoubtedly be made for redistribution of some of the large and "timid" stock holdings, and another allowance for the five years' increase of capital stocks and some conversions of bonds—these two last being normal changes making for an increase of stockholders. But they fall far short of explaining the great absolute

reinforcement of the body of railway shareholders during a period of railway stress and adversity, and leave as ultimate causation a bedrock confidence of the small and moderate investor in the railway future joined with his conviction of cheapness of railway shares of the better type. The waxing army of railway share owners who are investors pure and simple has also its suggestion of withdrawal from "the street" of a large part of the higher class of railway shares as material for speculation and the deeper point in another direction of the elemental power of the stock-owning post at the ballot box.

THE NEW PHASE OF RAILWAY CONSOLIDATION.

THE first phase of railway consolidation in this country by which great railway systems were built up was naturally the union of competing lines. The secondary phase was the union of connecting lines so as to obtain longer and, in many cases, through routes. Often these two processes went on together, but generally speaking, with competition as the force major and antecedent, and the economy of blending connected lines as a very important but secondary influence. The forms of consolidation, using the term broadly, took many shapes, varying with the form of acquisition of the component properties. There was—and is—the lease; the holding of a mere majority, greater or less, of the stock of the subsidiary, sometimes paying dividends, sometimes not; often the actual and complete merger when the stock of the acquired road had been nearly or entirely secured and the law was consenting; and, in some cases, especially of late years, the device of a holding company. Inside of all these variants of method there have been other variants though, of course, the principle of operating control by the great parent corporation runs through them all; and the general trend of financing by the big railway systems has been the reduction of the variants so far as possible.

This policy is now taking an enlarged shape which may be called the "big" blanket mortgage typified by the \$600,000,000 lien of the Great Northern and the great mortgage scheme of the New York Central System which, as a plan, has received official confirmation, but with details still to be worked out. A hint of the same general policy appears in the place of the New York, New Haven & Hartford of merging earnings and expenses of important subsidiaries in its next annual report. The latter system, by the way, has never yet placed any direct mortgage whatsoever upon its main stem. It must, of course, be obvious that the great mortgage schemes of such great railway systems are not new in form or kind. The "consolidated" mortgage, so-called, has given us a familiar adjective to express not only a method of refunding, but of securing new moneys. But what is really new is the vast scope of the proposed mortgages, their advantage and disadvantages and some of the obstacles that they must encounter before their consummation—obstacles very serious in the case of some railway systems, especially those with "consolidated" limited mortgages already outstanding, and which force the new "big" mortgage into the position of a second lien. The time element needed for refunding of senior subsidiary mortgages at a maturity more or less remote is yet another obstruction. Again, in the case of some lines, there is the right pertaining to long time debentures of sharing in any new mortgage rights, which amounts to the exchange of a mere railway note of hand for a mortgage security.

But, on the other hand, the advantages are many. It simplifies railway financing not only for the corporation, but for the investor. The "big" flexible mortgage takes care almost automatically of maturing obligations. It is a "familiar" investment, sure to be dealt in extensively in the market. It is almost certain to cover a great number of subsidiary equities in the large railway system, adding to its bed rock value, and ultimately it necessarily becomes a first lien upon a vast railway plant. It tends strongly to do away with the "short" and emergency financing expressed in these days by the short and

high rate railway note; and, finally, it is almost certain to be in a very large degree accepted by the holder of the matured senior security, thus doing away with extensive new financing through the underwriters. Even the long leases based on a rate paid upon stock may thus be extinguished, for it is merely a matter of inducement to be offered to the stockholder in the exchange; and the same is true of the bonds of a great railway system which have an extremely long time to run to maturity.

The ideal ultimate of the new consolidation of dependent lines, as distinguished from the old consolidations of lines originally independent, is the reduction of all securities of a great railway system to two simple forms—common stock and a single sweeping first mortgage. Each running high into its hundreds of millions. In its completeness it is an ideal pretty far away, especially when state legislation, past or future, is taken into account. There is also another very important limitation to be remembered. It is profitably feasible only for the large railway systems which are also steady dividend payers. No great blanket mortgage will appeal to investors unless the stock represents a handsome equity—in other words unless the system returns large earnings over fixed charges. Systems of lesser earning power may try the scheme, but it must be at the cost of a high and more or less speculative interest rate on the "big" mortgage, and probably with net fiscal loss. In the limits of the new fiscal consolidation looking to financial homogeneity, belong clearly such systems as the Great Northern and New York Central, not the Erie or the Wabash. But the great and steady dividend payers form so vast an aggregate as well as majority of the genuine railway investment interest that the railway groups of the minor and more speculative type may be ignored. The new theory of consolidation has a field so ample that the first ventures into it of two or three of the great railways have thus a profound significance.

WATER VS. RAIL TRANSPORTATION AGAIN.

S. A. THOMPSON, field secretary of the National Rivers and Harbors Congress, a letter from whom was printed in the *Railway Age Gazette* of June 30, page 1682, has written us another letter, this one being in reply to the editorial in our issue of June 30, entitled "The Cost of Rail and Water Transportation." In his second letter, which is given elsewhere, Mr. Thompson discusses further both the relative costs of rail and water transportation and the competition between railways and inland waterways. Before entering on a consideration of the points he seeks to make regarding these matters, it will be desirable to refer briefly to some matters in his communication that are not altogether germane to the discussion. By his general tone he seeks to convey the impression that our editorial statements were misleading. For example, he says that we made "numerous errors" in figures taken from the reports of the British Royal Commission. The only errors made were in giving the rates on the river Seine in France, and these were due to obvious typographical mistakes consisting in the omission of the decimal points from the figures. Commenting on our remark that the haul by the Great Lakes is circuitous, he compares it with the parallel haul by rail, which, he shows, is equally circuitous. As our comparison was between the haul by the Great Lakes and the haul via the Chesapeake & Ohio, his comments regarding the relative lengths of the rail and water hauls from Duluth to Buffalo are not apropos. He asserts that we garbled his statement regarding the value of the property and franchises that the public has given to the railways. He said: "The people of the United States have given outright to the railways property and franchises worth probably two and one-half billions of dollars." The "garbling" consisted in the unintentional substitution of the word "about" for the word "probably." In response to our invitation to bring in a bill of particulars listing the property and franchises worth \$2,500,000,000, which he asserted that the public has given the railways, Mr. Thompson concedes that perhaps his statement was a wild one. His own statements show that it was merely a bald

guess founded on no basis of fact or knowledge; and yet it was no wilder or more baseless than many other assertions that the waterway enthusiasts habitually make.

In our previous editorial attention was called to the fact that Mr. Thompson did not include in his figures regarding the cost of water transportation the expenditures which the public has to make to maintain waterways and to pay interest on the investment in them. He seeks in his second letter to meet this criticism by applying an allowance for the interest on and the maintenance of all the improvements that have been made on the Great Lakes to about two-thirds of all the traffic on them. He thereby arrives at the conclusion that the cost to the taxpayers of transportation on the lakes is but .07 mills per ton per mile. To use a computation of this sort as an argument for building ship canals hundreds or thousands of miles long is quite as rational, and no more so, as it would be to say that the improvement of New York harbor has cost a certain sum of money; that the interest on this applied to all the ocean traffic that moves to and from New York amounts to only so much per ton per mile; and that, therefore, New York harbor should be extended to San Francisco. The question before the people of the United States is not whether nature shall be induced to build more great lakes and the government shall then be prevailed on to dig more short canals to connect them. The question is as to whether deep waterways shall be built from the Great Lakes to the Atlantic ocean and from the Great Lakes to the Gulf of Mexico, and whether other similar projects shall be carried out. To get any real light on what the cost per ton per mile to the people in taxes would be for transportation on such waterways, we must look to the actual cost per ton per mile now incurred in existing canals and canalized rivers. The Sault Ste. Marie canal has the densest traffic of any canal in the world. The total tons of freight that passed through it in 1910 was 62,363,218. Its length is 2.7 miles (Bureau of Census Report on Transportation by Water in 1906, page 42). Assuming that every ton of freight that entered it passed through it, the total ton mileage handled on it in 1910 was 168,380,689. Its total cost has been \$13,000,000. The annual interest on this at 3½ per cent. would be \$455,000. This interest applied to the ton mileage handled in the canal in 1910 amounted to 2.7 mills per ton per mile. Owing to the heavy traffic in 1910 the interest per ton per mile was much less than in some years. For example, in 1906 and in 1908, making the computations on the same basis, the interest for each ton mile handled in the canal was over 4 mills. In other words, interest alone per ton per mile on the traffic handled in the canal amounts to from 40 to 60 times as much as Mr. Thompson estimates the combined interest and maintenance charges per ton per mile for traffic on the Great Lakes.

It is unquestionably true, as Mr. Thompson says, that "the tonnage carried on the Great Lakes made a good profit to the carriers and an enormous profit to the people." Nobody seriously questions that the public was justified in making the improvements that it has in the Great Lakes and that transportation on them is far cheaper than it is by rail. But it does not follow, because it is expedient for the public to build short ship canals to connect, and enormously increase the usefulness of, great bodies of water, such as the lakes, that it is expedient for it to spend the hundreds of millions of dollars that would be required to build a ship canal 1,657 miles long from Chicago to the Gulf of Mexico. Actual experience on the Sault Ste. Marie canal indicates that the cost in taxes to the public of building and maintaining any of the ship canals that are projected would amount to as much per ton per mile for the traffic handled on them as the average rates per ton per mile of many railways which handle mainly low grade traffic. The average rate per mile of the Chicago, Indiana & Southern, for instance, in 1909, was 4.1 mills; of the Chesapeake & Ohio, 4.1 mills; of the Bessemer & Lake Erie, 4.36 mills, and of the Chicago & Eastern Illinois, 4.76 mills. A ship canal from Chicago to the Gulf of Mexico, or from the Lakes to the Atlantic, would not cost anywhere near as much per mile as has the Sault Ste. Marie canal; but, on the

other hand, it could not get anywhere near as dense a traffic over which to spread interest and maintenance charges.

Mr. Thompson disputes certain of our statements with reference to the attitude of Col. Thomas W. Symons regarding the improvement of the Erie canal, and also asserts that Col. Symons has changed his attitude since he made his report on the Erie canal in 1897. It is worth while, therefore, to quote from a paper appearing in the publications of the Buffalo Historical Society, vol. 13, pages 1 to 14, entitled, "The United States Government and the New York State Canals," in which Col. Symons traced the history of the investigations and discussions regarding the enlargement of the Erie canal down to the year 1900. In the course of this paper he said:

"With everything reduced to the same basis, it was calculated (in his first report on the Erie canal) that the cost of transporting a bushel of wheat in lake freighters of 7,000 tons capacity through a suitable canal from Buffalo to New York was 2.28 cents; while the cost of transporting the same bushel in a fleet of barges each carrying 1,500 tons through a suitable barge canal from Buffalo to New York, and including the transfer charges at Buffalo, was 2.07 cents, and if the transfer charges were reduced, as they have since been reduced, to 1.66 cents."

In other words, Col. Symons estimated that the cost of transportation to the shipper in a ship canal would be 38 per cent. greater than the cost of transportation in a barge canal. Continuing, Col. Symons said:

"In making this comparison no consideration was given to the cost of the canal or the cost of operating it, the basis of comparison being the interest on the cost of carriers, deterioration thereof, insurance of carriers and cargoes, ordinary repairs, fuel, oil, and waste and wages and subsistence of the crews of the vessels. *If the first cost of the canal and the cost of maintenance and operation were taken into consideration, the showing in favor of the barge canal over the ship canal would have been still more marked.**

"The study was convincing that for the highest economy in transportation, special types of vessels are needed for use on the ocean, on the lakes, and on the canals, and neither can replace the other in its proper waters without suffering loss of economical efficiency. Ocean vessels could not, as a general rule, engage in the business of passing through a ship canal and the lakes to the upper lake ports, and lake vessels are not fitted for use upon the ocean, and if they made use of a canal they would have to transfer their cargoes at the seaboard, ordinarily by means of lighters, floating elevators, etc., at a higher expense than such transfers would cost at the lower lake ports. For economical transportation through a canal from the Great Lakes to the sea special vessels, differing from and far less costly than ocean or lake vessels, are required.

"The conclusion was reached by the writer that even if a ship canal were built, the greater cheapness of barge canal transportation would prevent its use by large ships, and cause it to be used almost entirely by fleets of barges, which could be almost equally as well accommodated in a smaller and cheaper canal."

Col. Symons said not a word in this paper to indicate that he had changed the opinions previously expressed by him regarding the relative costs of transportation on barge and ship canals.

In his first letter Mr. Thompson cited development of the waterways of Europe as an example to be emulated by the United States. The *Railway Age Gazette* in reply pointed out that the average cost of transportation on most of the waterways of Europe is much greater than the average cost of transportation on the railways of the United States. In his second letter Mr. Thompson deprecates references to the results of waterway development in Europe as examples of what might be expected to follow waterway development in the United States. He points out, as the *Railway Age Gazette* has already shown (March 25, 1910, page 813), that the waterways of Europe on which a large traffic is handled have been dug to only very shallow depths. He also shows that the hauls on them are very short. Because of their short hauls he objects to comparison of their rates with those of the railways of the United States, on which the average haul is over 250 miles. And yet he sees no injustice in comparing average railway rates in the United States with the average rates on the Great Lakes, which have been almost entirely created by nature, and on which the average haul in 1910 was 840 miles. Continuing, Mr. Thompson says: "Depth and width of channel and length of haul have a profound influence on rates of freight, and because we have many rivers which are wider and deeper than those of Europe, and on which hauls may extend to thousands of miles, the assumption is justified that much lower transportation rates are possible on our rivers than on those of

*The italics are ours. Col. Symons estimated the first cost of the barge canal at \$50,000,000, and the first cost of the ship canal at \$200,000,000.

Europe." In a later paragraph he says, "It has been claimed that the rivers of the United States are today in as good shape to handle a large traffic as are those of Europe, but I deny that this has been or can be shown, or that such is the fact." It would seem that Mr. Thompson's own admission that the rivers of the United States have greater width and depth than those of Europe should be sufficient to refute his contention that they are not in as good condition to handle a large traffic as are those of Europe, but if evidence on this point is needed it can be supplied from public reports. In its report on the proposed 14-ft. waterway from Chicago to the gulf of Mexico, the board of engineers of the United States Army said:

"The existing improved waterway of the Mississippi river below St. Louis fully equals, and over the greater part of its extent far excels, in both depth and duration of unobstructed use the existing river systems of Europe, where the non-tidal sections are usually given depths of only 2 to 9 ft., 9 ft. being exception and 10.5 ft. the maximum. The immense commerce of the Rhine could be carried more readily and cheaply on the Mississippi today than on the Rhine if such commerce were available for transportation by water and demanded such transportation. The decline in the commerce of the river has not arisen from its lack of navigability, but from a reduction in the amount of material available for shipment."

In the same report it was shown that the entire Mississippi river system, including the various tributary rivers, has depths greater than those on which a large commerce is handled on the rivers of Europe, the Missouri having a depth of 4½ ft. to Kansas City; the Ohio, a depth of 9 ft. to Pittsburgh; the Monongahela, a depth of 5 ft. into the Pennsylvania coal fields; the Kanawha, a depth of 6 ft. into the West Virginia coal fields, and the present waterway between Chicago and New Orleans a minimum depth of 4½ ft. Finally, it is stated in the report of the commissioner of corporations on "Transportation by Water in the United States," Part I, pages 28 and 29, that there are 225 navigable streams and 45 canals in this country, having an aggregated mileage of 28,600 miles; and of these 40 streams, with a length of 2,600 miles, have a depth of 10 ft.; and 70 streams with a length of 3,200 miles have a depth of 6 to 10 ft. Over 67 per cent. of the total water-borne commerce of Germany is carried on the Rhine and the Elbe, yet these two rivers together have only 617 miles of channel with a depth of 4½ ft. or more. That the existing waterways of the United States are unable to compete with our railways, while streams of much less depth are able to compete with the railways of Europe is due not to differences between waterways here and abroad, but to differences in railway rates here and abroad. Undoubtedly, further development of our rivers might enable them to make lower rates; it might enable them to make lower rates than those of Europe; but whether this would reduce the economic cost of transportation, which is the only thing the public is interested in is an entirely different question.

While seeking to show that our rivers are not as well developed as those of Europe, Mr. Thompson cites several rates made on them by which he seeks to support his contention that water transportation is intrinsically cheaper than rail rates. To persons who are not accustomed to dealing with such matters, his references might seem impressive, but to those who know how worthless are specific instances of low rates they do not carry conviction. It is quite easy to cite rates that have been made by rail that were very much lower than any of those by water to which he refers. As long ago as in 1877 the railways, in a rate war made a rate of \$1 a carload on live stock from Chicago to New York, which, for a carload of 20,000 lbs., figured out one-tenth of 1 mill per ton per mile. In the early part of 1904 the rate on wheat from Buffalo to various Atlantic ports for export fell to 2 mills per bushel. (XI I. C. C. Reports, page 14.) This rate between Buffalo and New York figured out .015 of one mill per ton per mile. These rates are less—the latter one is very much less—than any water rate Mr. Thompson cites. They do not, however, prove the superior cheapness of railway transportation any more than the rates he mentions establish the superior cheapness of water transportation.

The only rates that Mr. Thompson mentions which have any pertinency to this discussion are those for coal on the Ohio river; and even these prove when the conditions under which they are made are considered, to be no argument whatever in favor of

the greater cheapness of water transportation of anything but the very bulkiest and cheapest commodities. The coal rates to which he refers are made by boats which tow the coal from Pittsburgh to New Orleans in enormous consignments on flimsy wooden rafts. The method used has been described as follows:

"Three species of boats loaded on the Monongahela river for the Ohio river trade are used by the shipper, namely, coal boats drawing 8 to 8½ ft. and carrying 1,000 to 1,100 tons; coal barges drawing 6 to 7 ft. and carrying 500 tons; and coal floats carrying from 200 to 300 tons. The tow boats usually bring from the mines about 3,000 tons of coal in small fleets arranged for passing the locks conveniently. At Pittsburgh the small coal fleets are moored while awaiting rises sufficient for navigation on the Ohio river. When rises of 10 ft. occur, or sufficient to carry 8 ft. coal barges, fleets of from 10,000 to 15,000 tons are made up for shipment to Cincinnati and Louisville. At Louisville two, and sometimes three, of the Pittsburgh fleets are made up into monster fleets of from 35,000 to 45,000 tons and towed to New Orleans by powerful tow boats. A fleet conveying 40,000 tons covers about 10 acres."

After delivery of the coal at destination, the rafts on which it has been towed are knocked to pieces and sold, and the tow boat returns right to its point or origin. It is perfectly obvious that such transportation may be made much cheaper than railway transportation; and it is equally obvious that it is not adapted to the handling of any commodities except cheap and bulky ones, such as coal, sand, etc. That on the rates which it has been possible to make on the Ohio river it has not been possible to develop anything but traffic in such commodities as those mentioned, is shown by the fact that the total net tons transported on the Ohio itself declined from 7,525,667 tons in 1889 to 3,142,097 tons in 1906, and that the total net tons transported on the Ohio river system declined from 15,796,968 tons in 1889 to 15,226,805 tons in 1906. Of the total traffic handled on the Ohio river system in 1906, 10,968,307 tons was coal and 1,969,732 tons were sand and stone. It may be replied that the decline in water-borne tonnage, while the tonnage by railway was increasing was due, not to the fact that the cost of railway transportation was less but that the service rendered by rail was better. This probably is true. But if a transportation line, while making lower rates than a competing line, also gives such poor service that it cannot get any business, it would seem to be about as badly off as if it could not make as low rates as the competing line. If inland waterways are to compete successfully with railways, they must make rates which are *lower in proportion to the quality of the service that they render than those of railways.*

Mr. Thompson apparently seeks to convey the impression that the real reason why the railways have been able to attract business from waterways such as the Ohio and the Mississippi, having depths of from 9 to 30 ft., is that the railways have made rates low enough to exterminate water competition, which they have raised when the competition has been destroyed. He says that just so long as the railways are permitted to do this, "just so long will it be difficult for the people of the United States to secure the full measure of the benefits which ought to occur from the development of their waterways," and he speaks approvingly of the provision of the Mann-Elkins act which prohibits a railway from advancing a rate which has been reduced to meet water competition unless there has been some change in conditions other than the elimination of the water competition.

His attitude regarding this matter is much the same as that of most advocates of waterway development. They favor the development of waterways to stimulate or create competition which will regulate railway rates; but at the same time they demand legislation to prevent the railways from reducing their rate to meet water competition. In other words, they want waterways subsidized to compete against railways, but they want railways restricted in, or even prohibited from, competing against waterways. Until the agitation for waterway development began in this country, it was assumed here that competition consisted in each of two or more business concerns trying to get business away from rival business concerns. According to the new definition of competition advanced by the waterways advocates it consists in the government, after spending the public's money, to enable one class of concerns to attract business away from a second class of concerns, compelling the second class of concerns to refrain from striking back. We have always been somewhat

puzzled to understand how the waterway advocates expect the development of waterways to regulate railway rates if the railways are to be prohibited from reducing their rates to meet water competition.

There would be, under certain conditions, entire justification for legislation to prevent railways from excessively reducing their rates where they meet water competition for the purpose of destroying the water competition. But such regulation of railways under existing conditions is not equitable. For under existing federal laws, the rates of water carriers are subjected to no regulation, except when they apply to traffic carried partly by rail and partly by water; and then, manifestly, the purpose of the regulation is to reach the railway and not the water carrier. In consequence the water carriers are left free to, and do, commit every form of discrimination which, when committed by the railways, is denounced and penalized. They make lower rates to one shipper than they make to another on the same kinds of goods hauled in the same boat. They give secret rebates to some and not to others. They constantly charge higher rates for shorter than for longer hauls when this will serve their purpose. Now, a common carrier by water is just as much engaged in a public service as is a common carrier by rail. It exercises the power of eminent domain to get land for wharves; and, unlike railways, it uses channels which, to a greater or less extent, have been provided and are maintained at public expense. Inland water carriers are, therefore, under even more moral obligation not to discriminate between shippers than the railways. For the government to tax the public to subsidize water competition against railways, and at the same time permit boat owners to commit every form of discrimination which the railways ever committed, even in the old days of chronic rate wars and cut-throat competition, but which the railways are now prohibited from committing, is as good an example of unjust discrimination by the government itself as any of which the railways have ever been guilty.

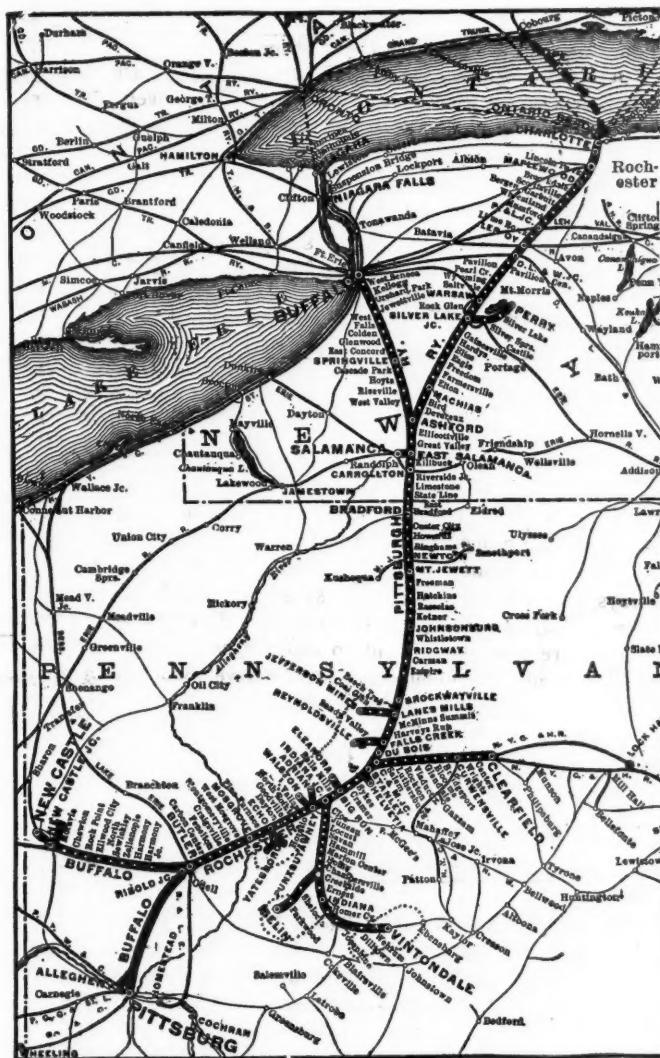
Those who advocate further development of inland waterways have never been heard to advocate also the application to water rates of the same requirements regarding publicity, 30 days notice of change, fairness and reasonableness, as are made regarding railways rates. Among the principal advocates of waterway development are the big shippers who formerly were the recipients of most of the secret rebates which the railways gave; and it seems not wholly improbable that some of them are now giving of their cash to finance the waterway campaign with the hope that they will not only thereby get the government to tax itself to pay part of their freight rates, but will also be able to get rebates from the boat lines which will compensate them for the loss of the rebates that they formerly got from the railways.

There is still wanting, in spite of the extended discussions of the subject, any evidence worthy of the name to support the contention that the further development of inland waterways, whether by the construction of canals or the canalizing of rivers for any considerable distance, either to depth suitable for barge traffic or for lake vessels, or for ocean-going steamships, would make water transportation any cheaper, even for the shipper, than rail transportation, difference in service being considered. There has not yet been adduced one scintilla of evidence that by such development of waterways the total economic cost of transportation, including both what the public would pay for the development and the maintenance of the waterways and what the shipper would pay to the boats, would be reduced, difference of service being considered. Indeed, the evidence, so far as any exists, is all the other way. It may be that by imposing all manner of restrictions on competition by the railways against the boat lines, while leaving the boat lines free to compete as they pleased against the railways, some stimulus might be given to the development of inland water traffic. But in such circumstances it could not be said that the waterways competed successfully against the railways, because there would be no real

competition. It requires no hardihood to predict that if the government spent even the maximum amount on the development of inland waterways that its advocates demand, and then imposed the same restrictions on the making of rates by water as it imposes on the making of rates by rail, the railways would be able to continue to secure as large a proportion of the total traffic moved as they secure now. The more such chosen spokesmen of the waterway propagandists as Mr. Thompson press their strongest arguments, the more clear it becomes that in the court of reason they have no case.

BUFFALO, ROCHESTER & PITTSBURGH.

IN general, if a railway's operating expenses in the fiscal year ended June 30, 1911 should be no higher than in the previous fiscal year, despite the increases in wages, we may assume either that the road has cut down on its appropriations for maintenance, or that it is operated more economically. This of course is as-



The Buffalo, Rochester & Pittsburgh.

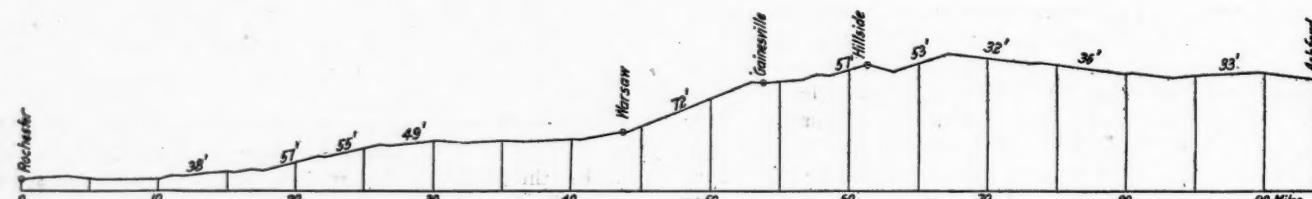
suming that the same or greater amount of business is handled by the road. Transportation expenses on the Buffalo, Rochester & Pittsburgh the first road to make its annual report for 1911, amounted to \$2,930,000 last year, an increase of \$380,000. This is an increase of 13 per cent. over the previous year, and is probably just about accounted for by the increased scale of wages paid employees. On the other hand, maintenance of way in 1911 cost \$1,150,000, and in 1910 \$1,220,000; and maintenance of equipment cost \$1,770,000 in 1911, and \$1,860,000 in 1910. In other words, in maintenance either there has been an increase in the efficiency per employee and a demonstration of economy

resulting from past expenditures both for maintenance and for additions and betterments, or else there has been a scaling down of the appropriations in order to show large net earnings.

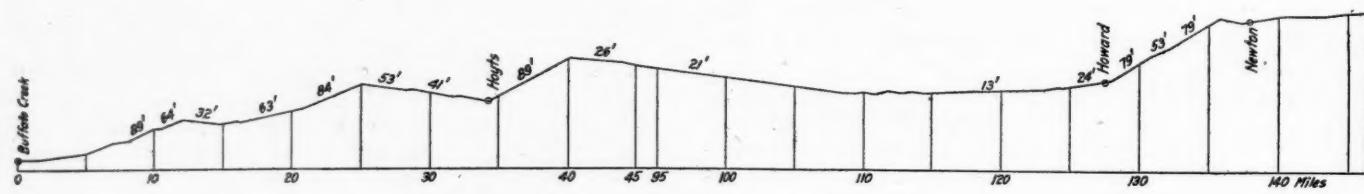
The fiscal year 1910 was a banner one for the B. R. & P. Its earnings, volume of traffic and profits were the largest in the history of the company. Its average train load of revenue freight was increased during the year from 597 tons, the 1909 figure, to 630 tons, the average for 1910. The average tonnage hauled per locomotive increased from 400 tons to 420 tons. In 1911 the Buffalo, Rochester & Pittsburgh went ahead even of 1910 in the figures for gross tonnage handled; the ton mileage in 1911 being 1,590,000,000, as compared with 1,573,000,000 in 1910.

replacement of bridges and other structures. The decrease in maintenance of equipment is due to the lower cost of maintenance of modern rolling stock."

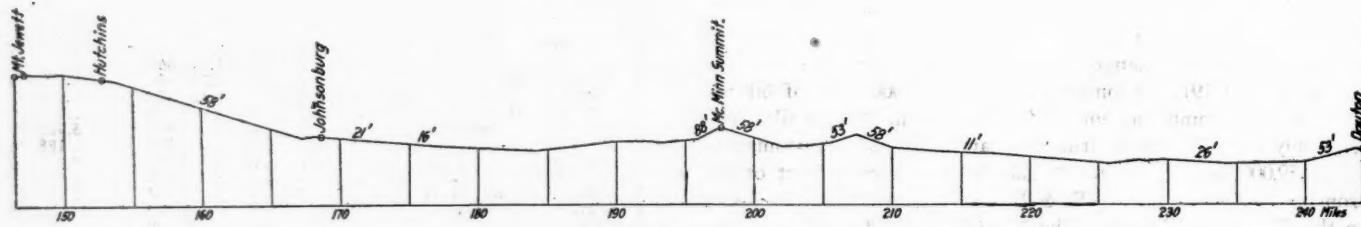
In justifying more than *adequate* expenditures for maintenance of way and maintenance of equipment, it is customary to speak of them as if such expenditures made in a given year, or over a period of years, will put a road in such shape that eventually much less per year will have to be spent to keep the property in good repair. But what actually happens is that the standard of practice keeps so well in advance of what even the most liberally maintained road can follow, that the effect of past liberal maintenance is seldom or ever reflected in lower present maintenance cost.



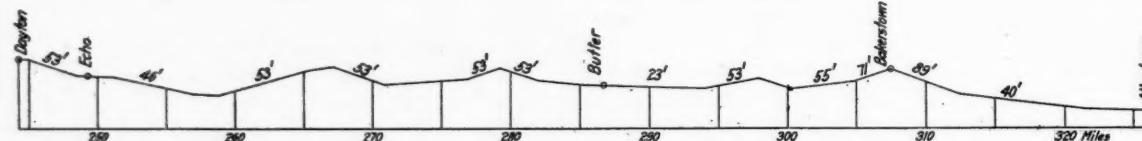
Profile Rochester, N. Y., to Ashford, N. Y.



Profile Buffalo Creek, N. Y., to J. & B. Junction, Pa.



Profile J. & B. Junction, Pa., to Dayton, Pa.



Profile Dayton, Pa., to Allegheny, Pa.; Buffalo, Rochester & Pittsburgh.

A comparison of earnings and expenses is given in the table at the end of these comments.

The detailed figures for operating expenses are not given in the annual report of the B. R. & P., so that it is more than usually difficult to form any judgment as to whether the road has suffered in any way from smaller expenditures on maintenance. We find, however, that the average train load in 1911 was 635 tons, or only three tons less than in 1910, and the average revenue tonnage hauled per locomotive was 430 tons, an increase of 10 tons over 1910. This certainly does not look as if maintenance in the motive power department has been in any way neglected. President Noonan, in commenting on expenses says: "Maintenance of way and structures show a decrease due to the mild winter and to the extraordinary charges made last year for the

Buffalo, Rochester & Pittsburgh appears to be an exception to this rule. Of course without a thorough first-hand knowledge of the entire property, it would be quite impossible to say definitely whether this was the case or not, but there are many indications in the annual report that would lead one to believe that the property had actually in the past been put in such shape that it could be maintained at a high or higher standard at a lower cost per year than formerly. No new mileage to speak of has been added to the property for a number of years. In 1911 the company operated 573 miles, or six miles more than was operated in 1910, and this increase in mileage was due to the purchase of a little road running from Silver Springs, N. Y., to Perry; and before that the mileage had actually decreased slightly from 1907 to 1910, due to realinement. On this short

road the company carries a very heavy density of mostly low grade freight traffic. The road is now double-tracked from Ashford, N. Y., to Punxsutawney, Pa., $8\frac{1}{2}$ miles, second track having been completed last year. During the year just closed about 500 feet of timber bridges were replaced with standard concrete structures, pipes and embankment. During the year approximately 48 track miles of 80 lb. rail were replaced with 90 lb. rail. Of this 12 miles was laid with titanium rail, 16 miles with open hearth, and the remainder with bessemer. The B. R. & P. apparently has adopted as its standard 90 lb. rail, and not 100 lb., the standard on the C. & O., for instance. Fifty per cent. of the ties renewed this year were treated at the company's timber preserving plant at Bradford, Pa., being creosoted with 10 lbs. of creosote oil per cubic foot of timber.

There seems to have been a policy, both as regards the finances of the road and the operation and maintenance of it, of concentration, or what might be called "intensive management," which has been decidedly successful. The road is lightly capitalized and in 1911 the net results of the financial operations showed a decrease of \$332,000 in the bonded debt of the company outstanding on June 30, 1911. The company up to 1908 had been paying 6 per cent. dividends on the common stock, in addition to 6 per cent. on the preferred. In that year dividends were reduced to 4 per cent. and were not again raised until the last half of the 1911 fiscal year, when they were increased to a 5 per cent. annual basis on the common stock. The road earned 9.2 per cent. last year on its total common stock, after the payment of preferred dividends.

There was a decrease of 17 in the number of locomotives in service from 1910 to 1911; a decrease of 597 freight train cars, and the only change in passenger cars was the addition of 2 motor cars. But on the other hand, the average capacity of each freight car was 38.85 tons last year, as against 38.30 tons the year before, and, as we have previously mentioned, the tonnage hauled per locomotive materially increased.

There was a notable difference in the character of the traffic carried last year from that carried in 1910, which probably explains some of the changes in operating statistics that we have mentioned. In 1911 the company carried 6,950,000 tons of bituminous coal, as compared with 6,530,000 tons in 1910, while there was only 244,000 tons of iron ore carried in 1911, as compared with 559,000 tons in 1910. Presumably the greater part of the iron ore carried by the B. R. & P. moves south from the Lakes to the Pittsburgh district. The great falling off in the tonnage of this commodity, which was due to the depression in the iron and steel trades, left the company with a large amount of equipment to be moved south light. The mileage of loaded freight cars last year was 48,660,000 as against 48,900,000 in 1910; while the empty mileage was 33,464,000 in 1911 and 30,093,000 in 1910. In other words, the fact that the company was able to almost maintain the record set for train load in 1910 in spite of the loss in iron ore tonnage, which necessitated a larger empty car mileage, was due to better car loading. The accompanying profile shows the character of the road on which these results were obtained.

On an average, the loaded cars in 1911 carried a thousand pounds more freight than in 1909. The average tons of freight per loaded car in 1911 was 32.68 tons. The increase in empty car mileage, when taken in consideration with the fact that the average engine load of *revenue* freight was 20 tons heavier last than the year before, makes it all the more probable that the equipment was fully maintained in 1911. This is further borne out by the fact that on June 30, 1911, 87.08 per cent. of the locomotives that were in service were in good condition as compared with 86.82 per cent. at the end of 1910, and although there were slightly more locomotives in service requiring repairs in 1911 than in 1910, there were fewer locomotives in shops under repairs.

For a road that is always spoken of as a typical coal road, the Buffalo, Rochester & Pittsburgh does a rather large passenger

business. In 1911 the passenger revenue amounted to \$1,066,000, an increase of \$80,000 over 1910. The company, however, figures that it loses on its passenger business. It figured its cost per passenger per mile in 1911 at 2.441 cents and its receipts per passenger per mile were 2.060 cents. It is very doubtful whether even an approximately correct estimate can be made of expenses, separating them as between freight and passengers and figuring them on a unit mileage basis. The Pennsylvania has given such figures in their annual reports for a number of years and Pennsylvania officers think that after years of experimenting and readjustment they have got a fairly accurate basis of separation, but even they would probably acknowledge that the figures are only approximately correct. One thing is worth mentioning about the Buffalo, Rochester & Pittsburgh passenger business. The average number of passenger cars to a train is only three, but notwithstanding this, the average number of passengers per train is forty.

Close control of a railway company by a banking house is sometimes used as an opportunity for running the road for other purposes than strictly public service and as an operating concern, but this charge could certainly not be brought against the Buffalo, Rochester & Pittsburgh. The control of the company is held quite closely by a firm of New York private bankers and their associates, but the policy of the management of the property has been to place authority in the hands of the officers on the road, and the results of the showing this year amply justify such a policy. Arthur Yates, who was president up to the time of his death last year, was a coal man as well as a railway man. At his death Adrian Iselin, Jr., of the banking firm of Iselin & Co., was elected president, but refused re-election last year, and William T. Noonan, who had been vice-president and general manager, was elected president.

The following table shows the results of operation in 1911 compared with 1910:

	1911.	1910.
Mileage operated	573	567
Freight revenue	\$7,748,179	\$7,562,259
Passenger revenue	1,065,983	986,370
Total operating revenue.....	9,134,402	8,936,117
Maintenance of way and structures.....	1,148,663	1,220,190
Maintenance of equipment.....	1,767,456	1,857,017
Traffic	131,403	120,169
Transportation	2,933,142	2,551,197
Total operating expenses.....	6,145,856	5,903,905
Taxes	212,000	188,095
Operating income	2,774,557	2,841,762
Gross corporate income.....	3,615,075	3,394,142
Net corporate income.....	1,709,277	1,527,373
Appropriations	246,500	190,000
Dividends	1,214,069	1,107,697
Surplus	495,208	419,677

NEW BOOKS.

Manual of the American Railway Engineering Association. Edition of 1911. 6 x 9 in. 477 pages. Published by the American Railway Engineering Association, Chicago. Price, paper, \$2.50; cloth, \$3.00; half-morocco, \$3.50.

The Manual of the American Railway Engineering Association, which has just been published, stands by itself as the authority on good practice in railway engineering and maintenance of way work today, and for this reason should be found on the desk of every railway officer having to do with the maintenance of track or structures. This book represents 12 years' work of the association, and is the result of careful study and investigation on the part of committees, whose recommendations and reports are reviewed and approved by the membership at large at the annual meetings. The Manual is not a treatise or text book, but is condensed and contains simply a statement of principles and conclusions, references being given below each subject to the volume of the Proceedings, where the text of the reports and full discussion may be found.

The new Manual is nearly twice the size of the last edition (issued in 1907) and contains a large amount of additional material which has been approved by the association since that date. All material in the preceding edition has been carefully edited and revised by the various committees to be in accordance

with present practice. The book is divided into 18 chapters, corresponding to the work of the standing committees of the association, each chapter being edited under the supervision of the respective committee. The subjects covered are: Roadway; Ballast; Ties; Rail; Track; Buildings; Wooden Bridges and Trestles; Masonry; Signs, Fences and Crossings; Signals and Interlocking; Records and Accounts; Rules and Organization; Water Service; Yards and Terminals; Iron and Steel Structures; Economics of Railway Location; Wood Preservation; and Electricity. Standard forms are given for keeping records of ties, rail failures, and other maintenance of way work. Specifications are given for timber, masonry, fence material, the design and construction of steel bridges, and the treatment of timber. The organization of forces for grade reduction, track elevation and steam shovel work are given, also a discussion of turnouts and spirals with accompanying tables.

Letters to the Editor.

RAIL VS. WATER TRANSPORTATION.

RICHMOND, IND., July 11, 1911.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

In the editorial in your issue of June 30 in reply to my letter in the same issue (in which I replied to an earlier letter from H. G. Moulton) you say that in my comparison of the relative rates on coal by rail and by lake I give "no consideration to the fact that the haul by lake is very circuitous, which makes the distance the coal moves very much greater than the distance would be as the crow flies, and makes the average rate *per ton mile* very much lower in proportion than is the *absolute rate* from the point of origin to destination."

The distance by lake from Duluth to Buffalo is 989 miles. The shortest line over which a locomotive could haul a train between the two cities named is 1012 miles. By using the ferry at the Straits of Mackinac, which is not a strictly all-rail route, but does avoid the breaking of bulk, the distance is 966 miles. In the one case the distance by rail is 23 miles more, and in the other, 23 miles less than the distance by lake. How "very circuitous" the lake route is, to be sure! It is a wonder it is able to compete at all. I do not see that the distance "as the crow flies" has anything whatever to do with the case, or will have until aeroplanes and dirigibles are utilized to establish an "air line" for the transportation of coal—and I do not look for that to happen either this year or next.

There is more justification for your next criticism, for my words, as written, can be interpreted to mean that a railway on which \$130,000,000 has been expended is no more artificial than are the Great Lakes, on which a similar sum has been spent. That was not the idea I intended to convey, which would be more nearly expressed as follows: "Neither a waterway nor a railway upon which \$130,000,000 has been expended is entitled to be called a 'highway ready made by nature.'"

Mr. Moulton's statement was, "the Great Lakes constitute a highway ready made by nature." That statement is in the present tense, and therefore refers to the lakes as they now are, and the rates under discussion are the rates now in force. Before the work of improvement was begun lake Ontario and Superior were shut off from the other lakes by impassable barriers. Depths at harbor entrances varied from 3 ft. to 9, and between lakes Huron and Erie there was a narrow, winding channel in which navigation was impossible for vessels drawing more than 8 ft., and was difficult and dangerous, even for those of that draft. Naturally, rates were vastly higher than under present conditions.

I am still unable to see that the lakes as they are today are "a highway ready made by nature," although I agree absolutely with your statement that what men "have done to make a highway of the lakes is incomparably smaller than what nature has

done." But exactly the same thing is true of the Ohio, Mississippi, Missouri, Columbia and many other rivers. When the work of improvement on these streams is completed, even if the expenditures shall be double the amounts now proposed, the share of nature in the creation of the resulting highways will be incomparably greater than that of man.

You say further that I did not include a return on the \$130,000,000 expended on the lakes in my figures regarding the cost of transportation thereon. That is an omission which I will proceed at once to remedy so far as it is possible to do so. There are no official figures in existence showing the total tonnage handled on the lakes; but as near as can be learned, it was about 100,000,000 tons in 1910. Neither is there anything to show the distance it was carried, nor the amount paid for its transportation, so the ton-mileage and the ton-mile rate are both unattainable.

All these facts are available, however, for the 62,363,218 tons of freight which passed through the "Soo" canals. If we take the \$3,900,000, which represents the interest at 3 per cent. on \$130,000,000, add to that \$1,100,000 to cover operation of locks, maintenance of light-houses etc., and put the entire burden on the "Soo" tonnage, which was really less than two-thirds of the whole, it would make the total cost of transportation only .85 mills per ton-mile as compared with the .78 mills which was the price paid for transportation. The tonnage carried on the Great Lakes paid a good profit to the carriers, and an enormous profit to the people whose investment made such low rates possible.

You accuse me of dodging, but on the face of it your criticism of my estimate of the value of all the property and franchises given to railways looks like misrepresentation. For you make a garbled quotation from my letter and then invite me "to bring in a bill of particulars listing the property and franchises worth \$2,500,000,000, which the railways have been given, with the value of each," when I had explicitly stated that no compilation of the figures has ever been made, and that at this late date it is impossible that it ever can be made. My statement showed plainly on its face that it was an estimate merely. Perhaps it was a wild one. Perhaps it deserves your criticism that it is sweeping; but it is no more sweeping than Professor Moulton's statement that there are waterway schemes before the people which call for an expenditure of \$2,500,000,000.* His statement did not call forth any criticism from you, which leads me to conclude that it is evidently not the sweepiness of statements which annoys you so much as the direction in which they sweep.

It is undoubtedly true that the old Erie canal was unable to successfully meet railway competition. In part this was due to the fact that year by year the canal was slowly deteriorating, while the railways were constantly being increased in efficiency. Fundamentally, however, it was due, to the same cause which has produced so large a decrease in the tonnage hauled on the rivers of the United States, namely: cutthroat competition by the railways. During the season of 1895 grain was carried from Buffalo to tide water for a price about equal to the cost of lighterage at New York. In other words the railway haul was made for nothing. This was done to reduce canal traffic to a minimum, hoping thereby to discredit the canal and induce the people of New York state to vote adversely on the pending proposition to expend \$9,000,000 in canal improvement. Just so long as railways, most of which come in competition with waterways over a very small portion of their total mileage, are left free to make rates low enough to exterminate water competition, raising the rates again when the competition has been destroyed, just so long will it be difficult for the people of the United States to secure the full measure of the benefits which ought to occur from the development of their waterways.

A very small beginning has been made toward remedying this

[*See *Railway Age Gazette*, July 28, for Prof. Moulton's defense of his estimate of the probable cost of proposed waterway development. The present letter from Thomason was written before Mr. Moulton's letter in our issue of July 28 was published.—Ed.]

condition. The "long and short haul clause" has been somewhat resuscitated, and one of the items of the Mann-Elkins Act prevents an increase in rail rates which have been reduced to meet water competition, except upon a showing which convinces the Interstate Commerce Commission that the proposed increase is justified by some change in conditions other than the elimination of such competition. I entirely agree with President Delano, of the Wabash Railway, that because of these enactments, pitifully inadequate as they are to fully meet the needs of the situation, it is nevertheless "quite possible that the opportunity for the development of traffic on navigable rivers is improving." I venture to predict that the people of the United States will go right ahead and create a great system of connected waterways, and will pass whatever legislation may be found necessary to enable these waterways to do the work for which they are created.

In criticizing my statement that, in my judgment, the people of New York "would have been much wiser if they had voted a sufficient sum to build a very much larger canal than the one now under construction," you refer to the fact that the people of New York decided to dig a barge canal 9 ft. deep on the strength of a report by Col. Thomas M. Symons, of the Corps of Engineers, United States Army, in which "he estimated that the cost to the shipper of transporting wheat in a lake freighter of 7,000 tons capacity on a ship canal would be 38 per cent. greater than with a towboat and barges on a barge canal. This took no account of the fact that the estimated cost to the public of building the ship canal would be four times as great as that of building the barge canal. Mr. Thompson's opinion on this subject does not weigh heavily in the balances against that of Colonel Symons."

The canal which the people of New York are digging is not 9 ft. deep but 12 ft., the depth recommended in Major (now Colonel) Symons' report of 1897, which report was made, not to the people of New York, but to the Chief of Engineers, United States Army. Lest there be any possible misunderstanding, let me say that I have the honor to know Colonel Symons, and have the very highest regard for him, both professionally and personally. But Colonel Symons never claimed to be infallible, and has modified his conclusions at least twice since the report of 1897 was submitted. That report recommended a canal which would pass barges carrying 1,500 tons. In 1898 he advocated a canal for 1,000 ton barges. At the present time the people of New York are spending \$108,000,000 in the construction of canals which will accommodate barges carrying 2,500 tons—with the approval of Colonel Symons as a member of the advisory board of consulting engineers.

It is not true that Colonel Symons estimated the cost of transportation would be 38 per cent. greater in a 7,000 ton steamship in a ship canal than in 1,500 ton barges in a barge canal, without reference to the greater cost of the ship canal. The table on page 88 of his report gives the estimated cost of transportation from Chicago to New York as \$1.29 per ton by ship canal and \$1.02 by barge canal. That is a difference of 26 per cent., not 38.

But other engineers pointed out radical errors in Colonel Symons' premises, and the elimination of these errors led to radically different conclusions. For instance, Colonel Symons assumed that the 7,000 ton vessel could maintain a speed of only four miles an hour in the canal portion of the route, while it is well known that ships which can run 12.5 miles per hour in the open lake maintain a speed of 10 to 11 miles per hour in the St. Clair Flats canal, a waterway of similar dimensions to the one proposed. He also assumed that ships would be compelled to spend 11 or 12 days in port in New York on each trip, time enough to enable them to cross the Atlantic to Liverpool and unload. This assumption is not only inherently improbable, but is contradicted by the records of work regularly done by many lines of boats in New York harbor.

On November 7, 1900, Mr. George Y. Wisner (since deceased) presented a paper before the American Society of Civil Engineers

on "The Economic Dimensions of a Waterway From the Great Lakes to the Atlantic." Mr. Wisner was a member of the Board of Engineers on Deep Waterways to which reference is made in the succeeding paragraph. Eliminating the errors in Colonel Symons' premises, utilizing the results of the study of the question made by that board, and taking into consideration cost of maintenance and interest on cost of construction, he estimated the rate per ton from Chicago to New York at \$1.39 by barge canal and \$1.09 by ship canal, a difference of \$0.30, or 27½ per cent., in favor of the ship canal. It is of interest to note that the ship canal rate mentioned is .797 mills per ton mile—almost exactly equal to the average rate paid on the business through the "Soo" canal last year.

On June 30, 1900, the Board of Engineers on Deep Waterways, composed of Major Chas. W. Raymond, Corp of Engineers, United States Army, Alfred Noble and George Y. Wisner, made a report on a canal from the Great Lakes to the Atlantic. This monumental report represented the results of a more elaborate and comprehensive investigation than has ever been given to any other waterway in the United States. It is rivaled only by the reports relating to the Panama canal. This report recommended a ship canal 21 ft. deep.

Colonel Symons had an appropriation of \$5,000, and a limited time in which to prepare his report of 1897. The board of engineers had an appropriation of \$485,000, and all the time needed for their investigation. My judgment that the people of New York would have been wiser if they had decided to build a canal much larger than the barge canal now under construction, was based partly upon this report. Is it your opinion that the three distinguished engineers composing that board were incompetent to conduct the investigation intrusted to their care? Or do you think that the conclusion reached by them, after such thorough study of the question, is not entitled to at least equal consideration with the opinion of a single engineer, even one so able as Colonel Symons?

In his report in 1898, as a member of the Committee on Canals of New York State, Colonel Symons stated his belief that water transportation, and he included transportation on canals and rivers, as well as on lakes and ocean, is inherently cheaper than railway transportation. Would it be unparliamentary for me to suggest that "your judgment on this subject does not weigh heavily in the balances against that of Colonel Symons?"

You say that while I was on the subject of European waterways I might have given some figures about the cost of transportation thereon, because "transportation on the canals and canalized rivers of Europe is much more nearly analogous to what transportation would be on canals and canalized rivers in the United States than is transportation on our Great Lakes." You then proceed to quote a number of transportation rates taken from the reports of the British Royal Commission, making numerous errors in the figures, the most important being the rate on the River Seine, which should be 2.6 to 5.6 mills per ton-mile instead of 26 and 56. The Rhone is not a canalized river, and the high rates thereon, 7.8 mills to 15.6 mills per ton-mile, are due to the extremely rapid current.

In a previous paragraph you criticized me for comparing "the rate on coal per ton-mile on the Chesapeake & Ohio with that on the Great Lakes from Buffalo to Duluth, without giving any consideration to the fact that the haul from Buffalo to Duluth is vastly longer than the haul on the Chesapeake & Ohio." This criticism applies with even greater force to your comparison between average railway rates in the United States and the average rate on the waterways of France, Belgium and even of Germany.

The average haul on the waterways of Belgium in 1905 was only 13.3 miles; on those of France it was 92 miles; while on the railways of the United States, considered as a system, the average haul in 1908 was 253.94 miles. The combined length of the 12 principal canalized rivers of France was only 970 miles, almost

exactly the length of the Ohio. The principal canals of France are adapted to boats drawing 5.9 ft., and the most of them average only about 60 ft. in width on the surface. The only waterway in France with a greater depth than this is the Seine from Paris to the sea. Many of the French canals are carried into mountains, the Canal de Bourgogne attaining an elevation of 1,634 ft. in a distance of 150 miles. Some of them depend on pumping for the water supply on the summit level in the summer. On the Canal de la Marne au Rhin water is pumped to an elevation of 256 ft. for this purpose.

The anxiety of certain railway people regarding the building of canals in the United States is just about as touching, and just about as well-founded, as the grief of the girl who was found sobbing by the river at a picnic. When asked the cause of her trouble, she said: "I was thinking that sometime I might get married and live in a house close to this river and have a baby and the poor little thing would fall in and get drowned." Can you refer me to any proposed canals in the United States which are in any degree comparable to the French canals which I have mentioned?

There are features, of course, in which transportation on the rivers of Europe is more analogous to transportation on the rivers of this country than to transportation on the Great Lakes, but it does not by any means follow that transportation rates on improved rivers in this country will be nearer to those paid on the rivers of Europe than to those paid on the Great Lakes. Depth and width of channel and length of haul have a profound influence on rates of freight, and because we have many rivers which are wider and deeper than those of Europe, and on which hauls may extend to thousands of miles, the assumption is justified that much lower transportation rates are possible on our rivers than on those of Europe.

But we are not compelled to depend entirely on assumptions. The board of engineers which reported on the proposed improvement of the Ohio river estimated that, when a minimum depth of 9 ft. is secured, coal can be transported from Pittsburgh to New Orleans at .376 mills per ton-mile and that general transportation, both up and down stream, can be probably conducted at $\frac{1}{2}$ mill per ton-mile.

Nor are these estimates based solely on theoretical considerations. Colonel Symons in his 1897 report stated that the average rate for carrying coal from Pittsburgh to New Orleans was .36 mill per ton-mile. The Board of Engineers for Rivers and Harbors says:

"It has been reported to the Board that coal has been shipped from Pittsburgh to New Orleans at a rate less than 0.4 of a mill per ton-mile, a rate the same as that charged at present on coal shipped on the 20-ft. waterway between Buffalo and Duluth where it is taken as a return cargo, the charge on iron ore from Duluth to Buffalo being at about twice that rate. The only instances known to the Board of cheaper rates are on ocean vessels of deep draft moving over long distances."

Sugar was carried from New Orleans to Pittsburgh in 1905-6, 2,000 miles up stream, for 1.14 mills per ton-mile, while the ocean rate for the 5,000 miles from Rio Janeiro was 1.27 mills. And these results were obtained on a river on which there was an average of only 79 days in the year when fully loaded boats could move to or from Pittsburgh.

Of course these figures do not include interest on the cost of improvements. There had been spent on the Ohio river up to 1906 \$15,000,000 in round numbers, interest on which would be \$450,000, which equals 3.46 cents on each of the 13,000,000 tons of traffic. No records show the average distance moved, but 300 miles seems a conservative estimate where some of it moved 2,000 miles. That would add .11 per ton-mile, making the total cost per ton-mile .47 mill on coal, 1.25 mills on sugar, and .61 mill for the general average as estimated by the Ohio river board. Do you know any railway that can make such rates as these and keep out of bankruptcy?

Discussion of other important points in your comment must be deferred until another time, since this letter is already long enough. It has been claimed that the rivers of the United States "are today in as good shape to handle a large traffic as are those

of Europe," but I deny that it has been, or can be shown, or that such is the fact.

I deny that advocates of waterway development "desire to injure the railways for their own benefit," or for any other purpose. I deny that the development of waterways would injure the railways of the United States. On the contrary, I contend that the railways would be greatly benefitted by such development, and believe that there are ample facts to sustain that contention.

S. A. THOMPSON,
Field Secretary, Rivers and Harbors Congress.

STEEL MOTOR COACHES FOR THE PENNSYLVANIA.

The new suburban line between the Cortlandt street terminal of the Hudson & Manhattan and Newark, N. J., will necessitate the Pennsylvania using a smaller type of car in order to meet the clearances of the McAdoo tunnel. A design was, therefore, prepared for a car 48 ft. long over the ends and 11 ft. 8 $\frac{1}{2}$ in. high from the top of the rail to the top of the roof. The maximum width of the car over the eaves is 8 ft. 7 13/16 in., and over the side door threshold plates 8 ft. 10 $\frac{1}{2}$ in. The total weight



Interior of Steel Motor Coach; Pennsylvania Railroad.

is 72,500 lbs. Three doors have been provided on each side of the car, one near each end and one in the center.

The general type of construction is the same as that used on all Pennsylvania steel passenger equipment cars. Experience with steel cars has demonstrated the necessity of providing a strong center sill construction. In freight service the minimum cross sectional area of the center sills, selected to meet all requirements, was 24 sq. in. For steel passenger cars used in fast through trains 50 sq. in. was considered necessary. For steel passenger cars for light trains in suburban service 33 1/3 sq. in. was considered a minimum. The multiple unit motor cars, each car being equipped with its own motors, can have a smaller section area of the center girders, but it should have at least as much as freight cars, for which reason an area of 25 sq. in. has been adopted. The construction of the center sills is of the box girder type, and is made up of 9-in. channels extending between the truck centers. At the truck centers the webs are spread apart and are spliced by steel angles to 5-in. channels, a bottom cover plate 7/16-in. thick by 22-in. wide and a top cover plate 5/16-in. thick by 30-in. wide.

The superstructure is carried on the two cross-bearers and two end sills in such a manner that any deflection of the center construction will not induce additional strains in the superstructure. The end sill consists of a curved channel securely

riveted to a platform plate, $\frac{1}{4}$ -in. thick, and to a bottom platform plate $\frac{1}{4}$ -in. thick. These top and bottom plates are, in turn, securely riveted to the center construction and to the end sill diaphragms. The cross-bearers are made of bottom cover plates $\frac{5}{16}$ -in. thick by 11-in. wide, pressed diaphragms made of $\frac{1}{4}$ -in. material, and two top cover plates each $\frac{1}{8}$ -in. thick by 11-in. wide. All of the strains are transferred to the center sill construction, which is amply strong to prevent the pressing down of the end of the car in a severe collision, and transfers all vertical strains directly to the center plate.

The platform plates extend from the end of the car for a distance of 5 ft. 6 in. toward the center of the car and are reinforced by U shaped diagonal braces, so that both the direct and cornering strains are definitely transferred to the center sill construction, thereby avoiding strains on the side framing which,

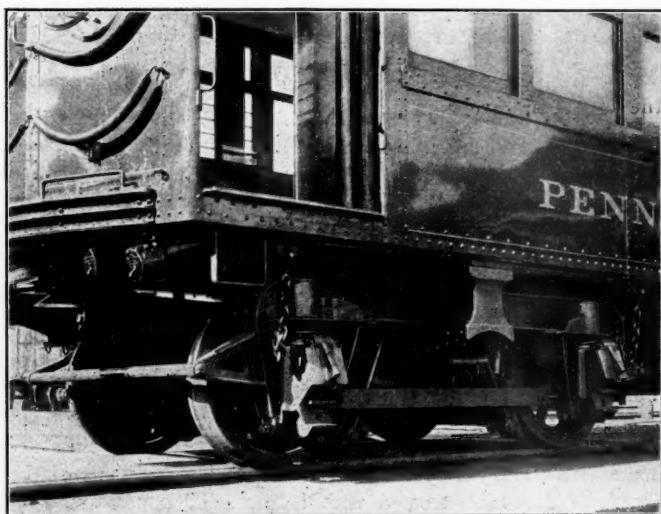
deck headlining consists of steel plates and the upper deck headlining is fiber board. The longitudinal seats have metal frames and are covered with rattan. The windows consist of two sash, the bottom one being fixed in place and the top one arranged to drop. The deck sash are made to open for ventilation. Adequate ventilation can be obtained by lowering the top sash of the side windows and opening the deck sash.

The drawbar is pivoted in a pocket which forms part of the center plate backing casting. The draft gear proper consists of a double coil spring placed inside of the hollow drawbar, and is held in place by a cap securely bolted to the drawbar casting, being similar to the draft gears ordinarily used on passenger equipment cars. The springs are double acting, thereby avoiding the use of two sets of springs usually applied to interurban cars.

In order to make these cars interchangeable with cars already in service in New York City, the Van Dorn coupler is used, the center line of which is located 2 ft. $5\frac{3}{8}$ in. above the top of the rail. The drawbar, draft gear and coupler head parts were so designed that the strains are, as nearly as possible, along the center line of the parts. The center plate proper is bolted to the center plate backing casting, and between the two a pocket is provided for the use of centering springs, allowing a side motion of 1 in. between the center line of the car body and the center line of the truck; the function of the springs being to form a cushion against the side strains and to provide also comfort in riding.

Each truck has one motor axle and one trailer axle, and the center line of the bolster is placed 2 in. out of center; that is, closer to the trailer axle for the purpose of giving the same weight between the wheel and rail for all the wheels of the truck. The side frames consist of 8-in. H-beams with pedestal castings riveted to each end. The transom is of pressed steel, and is made of $\frac{1}{2}$ -in. material. The peculiar shape is due to the fact that a central opening must be provided through which the body center plate must pass. The transom is rigidly attached to the side frames by means of corner gussets, which includes the brake hanger fulcrums. The bolster is placed inside of the transom, and is supported by triple elliptic springs carried by spring carrier bars, passing through and flexibly hung over the transom and the corner castings.

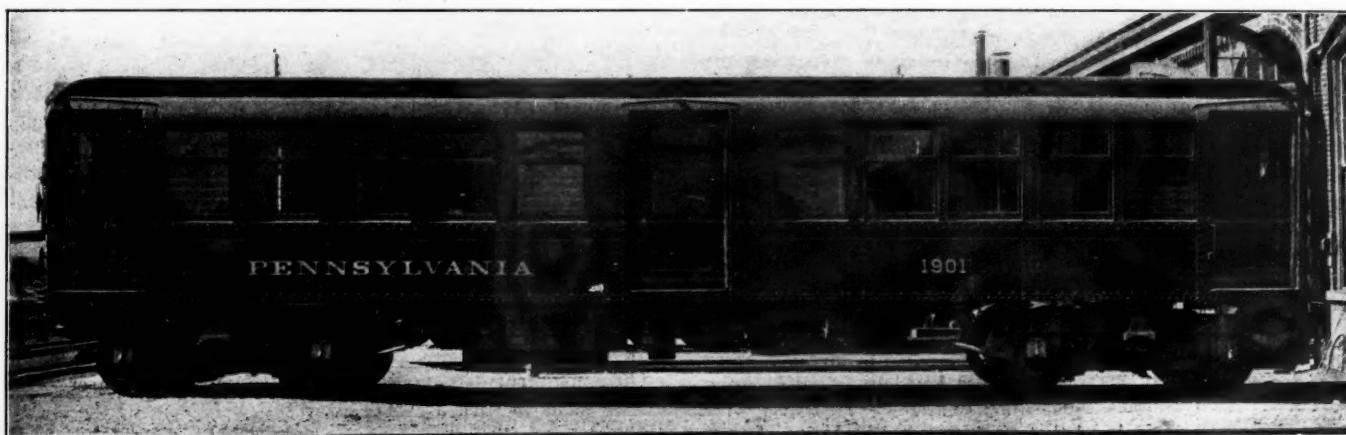
The body brake arrangement consists of two cylinder levers attached to a 12-in. x 8-in. brake cylinder. The other ends of the cylinder levers are directly connected to the equalizing bar passing through the center sills immediately above the center plate, which, in turn, are flexibly attached to two brake levers on each truck. The construction is of exactly the same type as that now in use on Pennsylvania steel passenger equipment cars. The truck brake consists of four levers, two on each side connected to the brake shoes, which are hung quite low; the levers are connected in pairs by struts, the bottom of one lever being connected directly to the strut, thereby giving



Truck for Pennsylvania Steel Motor Coaches.

on account of its narrowness, is not capable of resisting end strains. The main strength of the side framing is entirely below the windows and consists of a bottom side angle 5 in. x $3\frac{1}{4}$ in. x $\frac{5}{16}$ in., a web plate $\frac{3}{32}$ -in. thick, and a belt rail 4-in. wide by $\frac{3}{8}$ -in. thick. This side girder takes care of any load that may be placed in the car.

The detail construction is the same as in the steam service and suburban type cars, but somewhat lighter because the car is shorter. The interior arrangement is of the same type as generally used for interurban motor cars, with seats running longitudinally, and with pipe stanchions convenient as grab irons for people passing along the aisle. The flooring is magnesite cement composition with a hard surface, expanded metal being riveted to the flat plates to give it an anchorage. The lower



Steel Motor Coach for the Pennsylvania.

more brake power on the motor wheels. No brake beams are used. The type of brake is that known as the electro-pneumatic. Each car is provided with a slack adjuster to insure a uniform clearance between the brake shoes and the wheels, and therefore provide a uniform braking power.

The motors are of the G. E. 212 type, having a nominal rating of 225 h. p. at 600 volts. The gear is carried on the extended hub of one wheel. The front side of the motor frame is provided with two lugs which are supported by the truck transom. The axle bearing caps are bolted to vertically planed tongued surfaces on the frame. The motor can be mounted on, or removed from, the truck when run out from under the car without the use of a pit. The master controller is arranged to control changes of speed throughout the train and to automatically cut out the power and set the brakes when the motorman removes his hand from the handle. It has four positions in forward and two positions in reverse direction. The operating coils of the contractors and reversers are wound for a working potential of 625 volts. The entire control will operate successfully between 300 and 750 volts. The automatic circuit breaker is provided with a magnetic blowout for disrupting the arcs, and is enclosed in an iron frame with a sheet steel cover, lined with asbestos.

The cars are lighted by well distributed incandescent lights, and are heated by electric coils placed under the seats. For emergency lighting, in case the power is cut off, small storage batteries have been provided. The cars are also equipped with electric door signals and electrically controlled pneumatic engines for opening and closing the side doors.

THE DETERMINATION OF A REASONABLE RATE.*

BY W. M. ACWORTH.

Assume that in a study of railway rates we have reached this position: the public is entitled to claim not only reasonable facilities, but rates, reasonable both in themselves and in their relation each to the other. This they are most likely to get, if the matter is left to the discretion of the manager, and the manager of a private undertaking is to be preferred in this respect to the manager of a state railway, for, while he is likely to be equally honest and competent, his position tends to secure greater impartiality. The point that the decision should, as far as possible, be left in the hands of the actual management cannot be too strongly emphasized. The sketch given in *Studies in Railway Economics*, of the rate-making policy of different countries under one or two different heads, sufficiently shows that rate making is not an exact science, and that there is no universal agreement as to the principles generally applicable. In other words, rate adjustments from day to day can only be satisfactorily made by a man in whom a knowledge of the general conditions of the carrying trade of the country, and especially of his own district, has become a part of his nature, the very atmosphere in which his mind moves. The features on which a right decision depend are so infinitely numerous, the importance to be attached to each of them so entirely incapable of precise and positive statement, that right decision is far more a matter of instinct and intuition than of formal and logical reasoning.

"Old experience doth attain
To something like prophetic strain."

if the introduction of the stately poetry of Milton into the prose of everyday railway affairs may be pardoned. Better perhaps to quote the language of Bagehot, used by him in reference to city business, but certainly equally true of railways. The manager "has lived all his life in a sort of twilight, an atmosphere of probabilities and of doubt, where nothing is very clear,

*This article was originally intended to be part of the series of articles published in these columns under the title of *Studies in Railway Economics*, and takes its place properly before the article on *Studies in Railway Economics* published in the *Railway Age Gazette* of June 2, p. 1245.

where there are some chances for many events, where there is much to be said for several courses, where nevertheless one course must be determinedly chosen and fixedly adhered to." Of course the railway man may go wrong, but at least he is less likely to do so than any outside authority called in to sit in judgment on him; for atmosphere, instinct, sub-conscious knowledge are essential qualifications that cannot be produced to order, and cannot be made use of second-hand.

For all that we have to face the fact that the discretion of the railway expert will often be questioned: his decisions will not always go unchallenged. Possibly this may be the best proof of his impartiality, for just as opposing party politicians unite in reprobating "the cross bench mind," so two sets of traders, demanding simultaneously mutually exclusive concessions, are found agreeing in denunciation of the railway manager for not granting both. They may have a grievance—either or even both of them—possibly they have none; but something of the nature of a safety valve is an essential feature of any machine that is expected to operate smoothly and continuously, and so, were it to be only a safety valve, some tribunal of appeal from the decision of the railway manager must be provided.

And indeed the establishment of such a tribunal is justified on wider considerations. Every now and then in the progressive evolution of the science of rate making, there comes a time when it is evident to the experts that wide-reaching changes have become necessary; and yet the management of the private undertaking lacks the backing of public opinion necessary to put them into operation. Let me give two instances from actual experience, illustrating the point. When some years ago the North-Eastern electrified their railways on Tyneside, they found that the extra cost of providing separate first-class accommodations much more than absorbed the extra receipts from first-class passengers. They accordingly abolished first-class accommodations. Tyneside was up in arms. The columns of the *Newcastle Chronicle* teemed with letters of denunciation. Influential merchants and shipowners were aghast at the idea of riding from their villas at Tynemouth to their offices at Newcastle cheek-by-jowl with a North Shields fishwife. A deputation, with a duke at the head of it, demanded an interview with the North-Eastern directors. And the company surrendered at discretion. And today the dukes and the merchants and the shipowners have their first-class carriage, and the third-class fares of the fishwives help to pay the expense of hauling it. On the other hand, I was discussing a few weeks back the rates question with the chairman of one of the state railway commissions of America. He said that in his state the relations between the railway companies and the commission were entirely cordial. "In fact," said he, "it has happened that the railways have come to me and said: 'We are convinced that such and such a rate situation is indefensible, but it is of long standing and many interests depend upon it. We cannot alter it, but, if you choose to investigate the matter and make an order upon us to alter it, you will not find us in opposition.'"

There must then be a tribunal of appeal. But what should be the nature of the tribunal, what functions should it possess, and on what principles should it act? For the nature of the machine must depend upon the work it is called upon to do. If the considerations advanced above be true, that reasonableness is not something precisely ascertainable by scientific methods and accurate computations, and is rather a matter of instinctive judgment by a person whose mind is saturated with a general knowledge of all the facts, it is evident that in a matter such as the *quantum* of the individual rate, the appeal tribunal should only interfere reluctantly and in the last resort. A wise man in the affairs of everyday life accepts the judgment of the experts whom he consults—legal, medical, financial, or what not, not perhaps off hand, but finally, after questions asked and answered, ninety-nine times out of every hundred. And so here. The tribunal should, as it seems to me, put the railway manager publicly on his defense, compel him to justify his position, to

show that he has honestly and without bias taken into consideration all the interests and all the circumstances, and weighed them one against the other to the best of his ability. And then in almost every case, even if not satisfied, it should give a decision in some such form as this. "We cannot say that on the case as presented to us we have come to the same decision that you have reached; but you have convinced us that your action was honestly and deliberately taken in the interest primarily of the shareholders for whom you are trustee, but also with due regard for the interests of the public which we are here to protect. We further recognize that you are in closer touch with the facts than we are. It may well, therefore, be that you are right and we are wrong; at any rate, we do not feel that in this case we should be justified in interfering with your discretion in the management of the property that has been entrusted to you."

Such is my ideal of the way in which a tribunal of appeal might work, giving at once strength to the railways and protection to the public. For no manager, liable at any moment to be brought face to face with such a tribunal, would dare to make rates without mature deliberation and full consciousness of the rectitude of his action. And the tribunal itself, refraining, except in the last resort, from making orders, would when compelled to make them, speak with unique authority. For its judgments would rely for their enforcement not merely, to quote the statesmanlike words of Charles Francis Adams, "on the baton of the constable," but "on the one great social feature which distinguishes modern civilization from any other of which we have a record, the eventual supremacy of an enlightened public opinion."*

But, recognizing that from time to time, far-reaching questions must arise, on which an appeal tribunal will be compelled to form, and enforce its own opinion, we are driven to inquire by what principles it should be guided. I have already shown that on all main points, the importance of distance and the importance of size of consignment, no general agreement exists. Indeed, if there be any point on which general agreement does exist, I have so far failed to find it. Is the reasonableness of the rate to be tried by the test of what it is reasonable for the railway to receive, or what it is reasonable for the customer to pay? At the lower end of any scale of rates there will be general agreement that it cannot be reasonable to compel the railway company to carry traffic at a rate which does not cover the out-of-pocket cost of doing the business. But at the upper end, when it is a question whether the rates of a company earning substantial dividends can be reasonably reduced, there is no such agreement. One of the greatest lawyers that England produced in the 19th century, Lord Selborne, delivering the judgment of the Privy council in the case of the International Bridge Company,† said, that "the case might be imagined of the results to a company being so enormously disproportionate to the money laid out upon the undertaking as to make that of itself possibly some evidence that the charge is unreasonable, with reference to the person against whom it is charged." But he scouted the theory that charges could be regarded as unreasonable because "the company gets a dividend which is alleged to amount at the utmost to 15 per cent." And this judgment was cited and followed by the late Lord Collins in our Railway Commission in 1895, and has remained unquestioned ever since. "The affluence or indigence of the person rendering or receiving the service is outside the question. The reasonableness of the charge must be measured by reference to the service rendered and the benefit received, which is unaffected by the prosperity or misfortune of the parties to the contract."‡ On the other hand, it is being argued at this moment all over the United States, before courts and railway commissions, in the legislatures and in the press,

that rates cannot be reasonable which enable a railway company to earn more than a maximum of 6 per cent.; and this 6 per cent., calculated, not on the present value of the property, but on the actual cash invested in it from the outset of the undertaking. For instance, in a recent lecture in the Yale University, Mr. Prouty, one of the senior and ablest members of the Interstate Commerce Commission, discussing the question of the control of rates by the public authority, spoke thus: "I have said that the capitalization of a railway ought to represent the money actually invested. Ordinarily, the dividends paid on the capital stock ought not to be extravagant. Mr. Hill said in giving testimony before the commission, that 7 per cent. was enough. I think he is right. Only in extreme cases would a larger dividend be justified."¶ And the whole of the decisions of the Interstate Commerce Commission in the two recent most important cases, where the railways unsuccessfully sought permission to raise whole blocks of rates, are saturated with the theory that the profits of the railway company are a main element in determining what rates are reasonable.

THE NORTH COAST RAILROAD.

Since it first became known that the North Coast Railroad was being projected through that part of Washington, heretofore the undisputed territory of the Northern Pacific and Great Northern, unusual interest has attached to the enterprise. Until the new road was consolidated with the other Harriman lines in the northwest, it was not definitely known which one of the railway interests was backing the new company. Up to the time of the consolidation of the Oregon Railroad & Navigation Company, the Oregon & Washington Railway and the North Coast Railroad and other Harriman lines as the Oregon-Washington Railroad & Navigation Company, the lines of the O. R. & N. had fairly well covered the territory of northern and eastern Oregon, and the territory along the Columbia and Snake rivers in southeastern Washington. An important branch of this road also reached Spokane and the Coeur d'Alene mining country near Wallace, Idaho, by a route that was handicapped by extremely heavy grades and curvature and excessive distance. With the exception of the short branch westward from this line to Connell in the Big Bend country of central Washington, practically no effort has been made to compete with the Northern Pacific and Great Northern in the vast productive territory extending north of the Snake river, 350 miles to the Canadian line, and west from Spokane, 200 miles to the Cascade mountains. The enormous wheat traffic originating in the Big Bend country was practically all out of the reach of the Oregon Navigation Company, as well as the traffic in products raised in the vast irrigable areas along the Columbia, Yakima and Wenatchee rivers. Since the Harrimann interests abandoned the project to enter the Puget Sound country in 1890, all of the above territory and the entire region tributary to Seattle and Tacoma had been the exclusive territory of the Hill lines.

This was the condition when, in 1906, Robert E. Strahorn, who was at that time principally interested in developing public utility enterprises in cities in Idaho, Oregon and Washington, was found to be backing various disconnected railway surveys in different parts of the states named. Apparently the work had already proceeded for several months, for at the time the North Coast Railroad Company was organized, with the nominal capital of \$500,000, many miles of important right-of-way had been secured, franchises in a number of cities had been applied for, and negotiations with the national government and the several

*"Railroads: Their Origin and Problems," p. 140.
†"Canada Southern Railway v. International Bridge Company," eight appeal cases, p. 731.
‡"Rickett Smith v. Midland Railway Company," nine railway and canal traffic cases, p. 113.

Every Day Ethics, p. 98.—Mr. Hill's railway, the Great Northern, has paid a steady dividend of 7 per cent. for the last 20 years. One cannot but be reminded of the immortal Alice—"Four inches is a very good height," said the caterpillar, sharply. "He was just four inches himself." Whether Mr. Hill reminded the commission that his 7 per cent. dividend is paid on share capital, all of it issued at par, though for many years it has commanded a very large premium in the open market, I have no means of knowing.

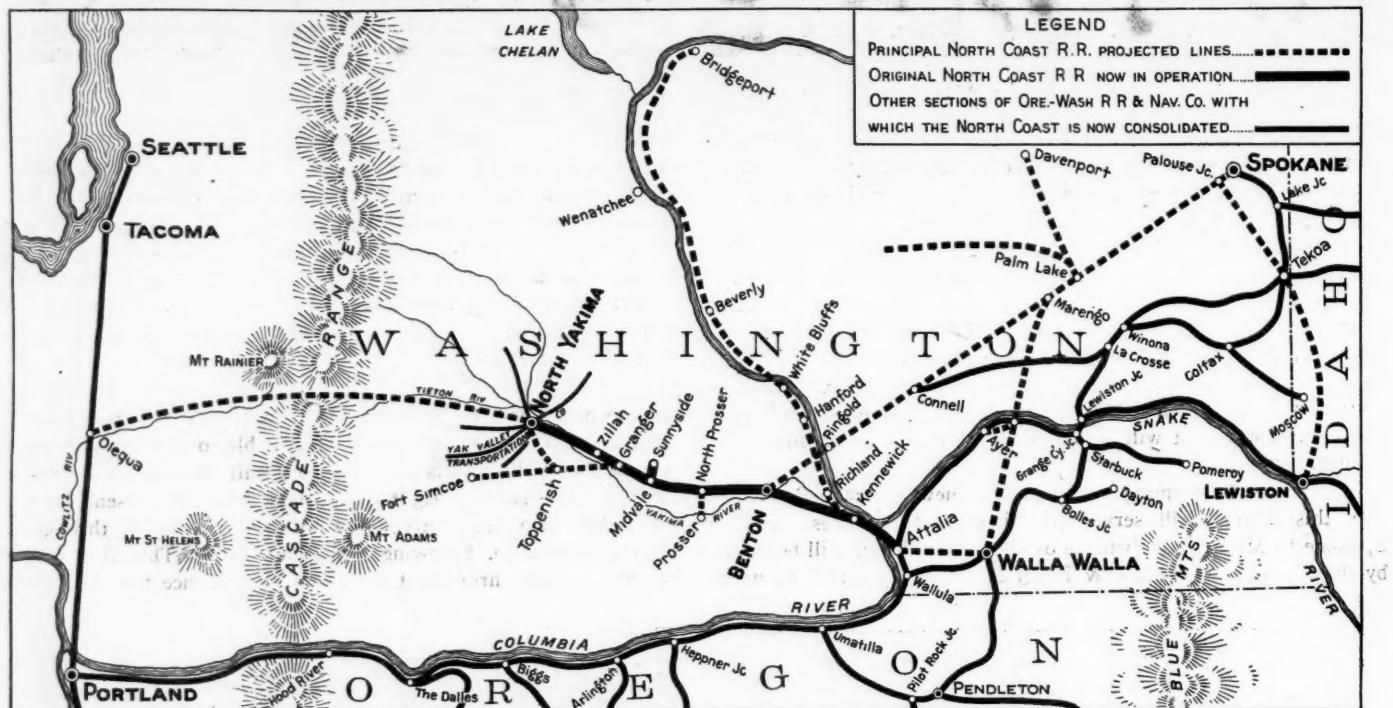
state governments had been started to obtain the important rights necessary for the building of the line.

The officers of the new company were Mr. Strahorn, president; R. J. Danson, vice-president; F. L. Pitman, chief engineer; A. G. Smith, secretary and treasurer; C. E. Woods, general right-of-way agent, and George M. Hofford, auditor. Most of these men had been associated with Mr. Strahorn before that time, and the spirit of loyalty which he was able to instill into them was accountable for the success with which the enterprise of building the road was carried through. The fact that it was necessary to preserve absolute secrecy as to the ultimate object of the new road made its building particularly difficult, and the story of how the secret was guarded is as romantic as railway history ever becomes. Mr. Strahorn has a personality which makes him most approachable by, and especially popular among newspaper men, and it is to his credit that during the years of the building the road he was always perfectly frank with representatives of the press, and gave out personally a great deal of information about his project to the papers throughout the northwest, but during the entire time no indication of the object in building the road or of the financial interests which were behind the enterprise

and the great areas of densely timbered uplands along the mountain range, besides extensive coal areas on the west side.

The most important engineering feature of the completed section is the bridge across the Columbia river just below the mouth of the Snake. This bridge with approaches is 2,900 ft. long, composed mainly of Howe truss spans of 150 ft., supported on 12 concrete piers and a draw span of 240 ft. Most of these piers were built in water which at average stages was about 25 ft. deep. It was completed in less than twelve month actual working time without a casualty or loss of any kind. The completed line has a maximum grade of 0.5 per cent., and a maximum curvature of 3 deg. Several short branches have been completed, the most important of which extends into the Sunnyside orchard country.

In order to provide a direct route from Spokane to Portland, a new line between Spokane and Ayer, a station on the Snake river line of the O. R. & N., is being built. This section is 103 miles long and will reduce the distance between Portland and Spokane by 54 miles. The road runs through the Palouse canyon and presents some very difficult construction problems. The nature of the canyon can readily be seen from the accompanying

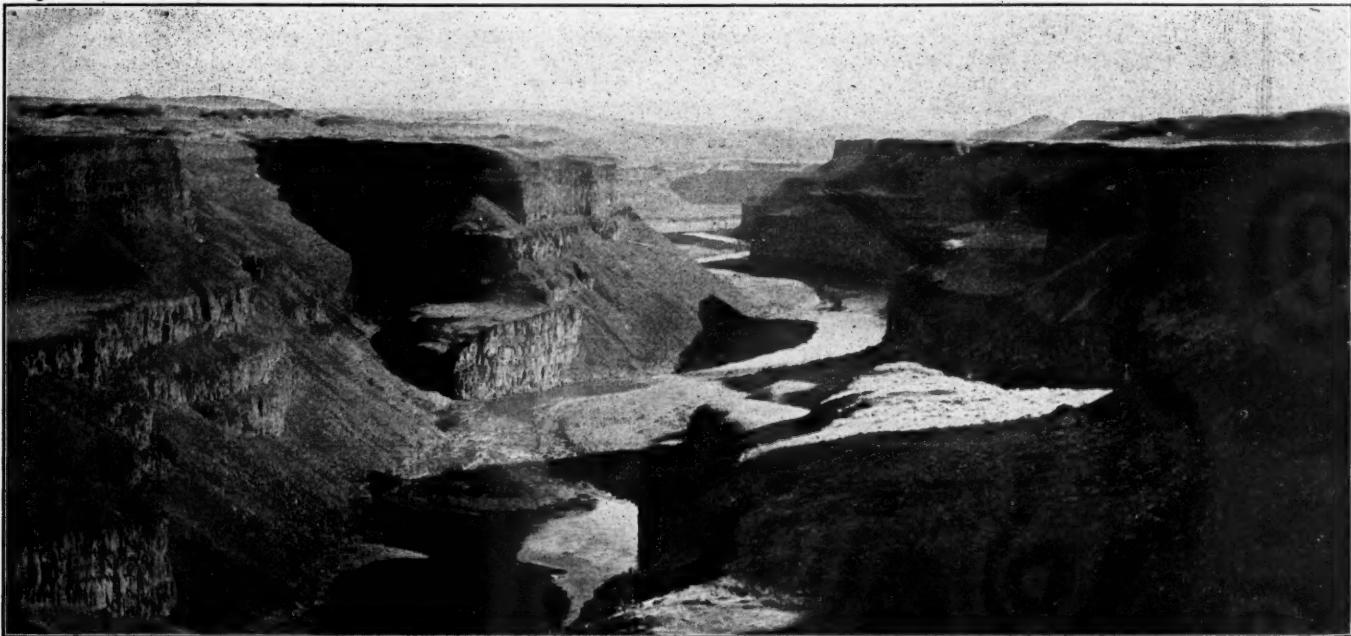


The Oregon-Washington Railroad and Navigation Lines in Washington.

was ever allowed to escape. The entire expenditure for surveys, construction work, right-of-way and terminal property was made in personal checks signed by Mr. Strahorn.

At the time of the absorption of the North Coast property by the Harrimann lines, there was about 1,000 miles of the new road surveyed, of which 100 miles was nearly completed and has since that time been put in service. The map reproduced herewith shows the relation of this new line to the existing lines of the Harrimann system. The completed section leaves the O. R. & N. at Attalia, and runs northwest through the valley of the Yakima river to North Yakima. This is the first step in the Puget Sound line, and is designed to continue through the valley of the Naches river and cross the Cascade range in Tieton pass, descending the west slope in the valley of the Cowlitz to a connection with the Portland-Seattle line of the Oregon-Washington Railroad & Navigation Company at Olyqua. This line will cross the Cascades on a 1.25 per cent. maximum grade, while no existing line has a lighter grade than 2.02 per cent. maximum. The new line has great traffic possibilities in the fertile valleys which it traverses on both sides of the summit

photographs. It is practically a sheer precipice for 8 miles of its length, ranging in depth from 200 to 600 ft. Six tunnels will be included in this section, the longest being 1,800 ft. between portals. Several enormous rock fills bridge the deep side gorges between tunnels, notably one across Field's Gulch, which is 170 ft. high and 1,200 ft. long, requiring 800,000 cubic yds. of material. The line will pass almost directly over the Great Falls of the Palouse, where the river, which runs in a box canyon 300 ft. deep, suddenly drops a distance of 190 ft. It is estimated that the grading alone on several portions of this line will require an expenditure of at least \$175,000 a mile. This section of the new road also includes a large bridge which spans the Snake river at the mouth of the canyon. This bridge will be 1,220 ft. long, and be approached by two steel viaducts, the north one 2,260 ft. long and the south one 490 ft. It will be supported by five steel towers each resting on four separated concrete piers, its maximum height above water level being 260 ft. Spanning the river will be five, deck riveted truss spans of 226 ft. each. The bridge will require about 5,000 tons of steel and will cost about \$625,000.



Looking Down Stream in Palouse Canyon Through Which O.W. R. & N. is Building.

In addition to the Snake river bridge, this line will include two bridges across the Spokane river within the city limits of Spokane, the longer one being 3,400 ft. in length, and the shorter one 1,000 ft. The first bridge will be 180 ft. high and will be built of plate girders of 80 ft. span between tower span of 40 ft. There will be required 6,500,000 lbs. of steel and 3,000 cubic yds. of concrete. The other bridge is also at a high elevation above the water level, and passes 35 ft. above the great concrete bridge now being built by the city and in full view of the falls of the Spokane river. Contracts for the building of all of this section of the road have been let, and much of it is already completed. It is expected that it will be ready to put in service in about 18 months.

In addition to forming a link in the new Spokane-Portland line, this section will serve other important purposes. From Spokane to Marengo, a distance of about 60 miles, it will be used by the Chicago, Milwaukee & Puget Sound as a part of its new

line via Spokane to the coast. It will also form a link in the North Coast through line to Seattle. From Marengo the line is projected through Connell to Benton on the Attalia-North Yakima section, where it will join the line to Tacoma and Seattle described above. From Palm Lake, a point about 50 miles southwest of Spokane, a branch is projected northward through the Big Bend country to Davenport, also an important spur westward from this branch. A line from Ayer to Walla Walla has been surveyed, which, in connection with the Spokane-Ayer line, will reduce the distance between Spokane and Walla Walla about 65 miles, and, on account of the low grades and improved alignment of the new road, it will be possible to run trains from Spokane to Walla Walla in about one-half the time now required and to handle freight at far less than the present cost. A line has also been surveyed from Spokane south through Tekoa to Lewiston, following Hangman creek. This line will have easy grades throughout its length, will reduce the distance



Fill of 100 Feet Between Tunnels Numbers 7 and 8 in Palouse Canyon.

between Spokane and Lewiston about 25 miles, and will enter a new country rich in timber, farming and mining resources. Lines have also been projected from Kennewick and Benton northward along the Columbia river to the mouth of the Okanogan, reaching the territory around White Bluffs, Hanford, Wenatchee and Orondo. Surveys have been perfected and a great deal of the right-of-way secured on all of these projected lines.

Among auxiliary features is the extension of electric lines in the Yakima valley by the Yakima Valley Transportation Company, an enterprise controlled by the same interests and also under the management of Mr. Strahorn. Up to date about 30 miles of high class electric branches have been built, radiating in different directions from the city to North Yakima, which are being extended into the most productive zones. They serve some of the finest orchard lands of the state and will prove valuable feeders to the steam railway lines with which they are affiliated.

Inseparably connected with the North Coast enterprise is the union passenger terminal at Spokane. This important enterprise, involving an expenditure of some \$7,000,000, carries with it the entire separation of grades for six miles through the city,

business center. It also provides the Oregon-Washington Railroad & Navigation Company large and very centrally located



Station at Benton, Wash., Typical of Those on the Yakima Division.

freight terminals, 300 to 600 ft. wide and 4,000 ft. long. The passenger terminal and the approaches from east to west



Reconstruction of Northern Pacific Line in Marshall Canyon to Make Room for O.W. R. & N.

and the occupation of a central zone from east to west, solving the problem of the entrance, exit and traffic of four or five



Concrete Highway Undercrossing Five Miles Southwest of Spokane.

railway lines through the heart of the city, and the placing of their union passenger terminal within a block or two of the

through the city will be utilized by the Oregon-Washington Railroad & Navigation Company, the Chicago, Milwaukee & Puget Sound, the Canadian Pacific and the Idaho-Washington Northern, together with their various branches. The passenger terminal grounds are from 200 to 300 ft. wide, and three-fourths of a mile long. The entire terminal plan and approaches are designed to accommodate future railways entering the city from all directions, and as the station and track layout are closely related to the various electric and suburban lines, it presents a very complete and happy solution of the handling of a large proportion of Spokane's passenger and freight traffic.

A branch line, 100 miles long, is now being built from Zaria, Nigeria, in a southeasterly direction in order to reach the Bauchi tin fields. It is to be constructed at a cost of \$973,300 on a 2 ft. 6 in. gage. The question of this alteration of gage has been critically discussed and the relative advantages of having a standard gage throughout the country have been emphasized; but it is considered advisable to avoid the initial expense of constructing on the wider gage, the proposal being to convert the railway to the larger width when traffic requirements show the step to be necessary.

ACCIDENT BULLETIN NO. 39.

The Interstate Commerce Commission has issued accident bulletin No. 39, containing the record of railway accidents in the United States during the three months ending March 31, 1911. The number of persons killed in train accidents was 146, and of injured 3,228. Accidents of other kinds, including those sustained by employees while at work, by passengers in getting on or off cars, by travelers at highway crossings, by persons doing business at stations, etc., by trespassers, and others, bring up the total number of casualties, excluding "industrial accidents," to 18,554 (2,124 killed and 16,430 injured). The casualties are classified in table No. 1, given herewith, which includes some details from table 1B, not here shown. (The incident statistics of electric lines are given in a separate table.) Supplementing the statement of railway accidents proper, the commission gives the following record of "Industrial Accidents"; those occurring to employees of the railway on railway premises in which the movement of the cars or engines is not involved:

	<i>Industrial Accidents to Employees.</i>	Killed.	Injured.
While working on tracks or bridges.....		36	3,732
At stations, freight houses, engine houses, coaling stations, water stations, etc.....		38	4,692
In and around shops.....		17	8,624
On boats and wharves.....		4	370
At other places.....		18	1,240
Total		113	18,658

Adding the casualties to employees in industrial accidents to the figures given in the larger table, the total number of employees killed, including those not on duty, is 819, and injured 29,632; and this makes the total number of persons killed, all classes, 2,237, and injured 35,088.

The most striking comparison between this quarter and that of one year ago is in the number of passengers killed in train accidents, which falls from 110 to 28. In 1910 this record was swelled by a disaster due to an avalanche killing 51 passengers and a derailment killing 45. The falling off in the number of employees killed in train accidents and by other causes, when coupled with a diminution of 18 per cent. in the money loss from collisions and derailments (Table 2), is perhaps indicative of a moderate volume of freight business and an absence of severe weather in northern climates. Changes of conditions caused by the change from autumn to winter are suggested by the differences between this quarter and the last one (Bulletin 38) in the statistics of deaths and injuries of "other persons," etc., as given in Table 1.

TABLE NO. 1A.—COMPARISON OF PRINCIPAL ITEMS WITH LAST BULLETIN AND WITH ONE YEAR BACK.

	Bulletin 39.	Bulletin 38.	Bulletin 35.
1. Passengers killed in train accidents.....	28	30	110
2. Passengers killed, all causes.....	66	96	155
3. Employees (on duty) killed in train accidents	105	199	242
4. Employees (on duty) killed in coupling.....	55	60	57
5. Employees (on duty) killed, total.....	647	841	945
6. Total, passengers and employees (items 2 and 5, above).....	713	937	1,100
7. Other persons killed (including trespassers, non-trespassers, and employees not on duty), all causes.....	1,411	1,722	...
8. Employees killed in industrial accidents...	113	107	...

The total number of collisions and derailments in the quarter now under review was 2,801, of which 200 collisions and 160 derailments affected passenger trains. The damage to cars, engines and roadway by these accidents amounted to \$2,124,090, as shown below:

TABLE NO. 2.—COLLISIONS AND DERAILMENTS.

	Number.	Loss.	Killed.	Injured.
Collisions, rear	270	\$347,829	31	461
Collisions, butting	120	153,778	11	595
Collisions, train separating.....	99	40,956	1	25
Collisions, miscellaneous.....	898	378,160	35	658
 Total	1,387	920,723	78	1,739
Derailments due to defects of roadway, etc.	306	251,292	11	435
Derailments due to defects of equipment	626	541,683	13	146
Derailments due to negligence.....	91	53,815	4	86
Derailments due to unforeseen obstruc- tion	98	91,618	5	107
Derailments due to malicious obstruc- tion	12	20,228	3	31
Derailments due to miscellaneous causes	281	244,731	14	262
 Total	1,414	1,203,367	50	1,067
 Total collisions and derailments	2,801	2,124,090	128	2,806
Total for same quarter of 1910.....	3,366	2,831,469	219	3,175
1909.....	3,206	2,733,830	220	3,731
1908.....	2,684	1,940,133	173	2,616
1907.....	3,964	2,962,470	197	3,813

In the larger double column table will be found the usual list of class A train accidents—all in which the damage is reported at \$10,000 or over, notable cases in which passengers are killed, and those doing damage less than \$10,000 and down to \$2,000, wherever the circumstances or the cause may be of particular interest.

Collision No. 4, between eastbound freight train No. 6 and westbound freight train No. 7, was due to the non-delivery of an order to the westbound train. The despatcher, according to his own statement, sent this order to F, directing the train to meet the eastbound train at that station, and he says that the order was received and acknowledged by the station telegrapher. This station operator claims not to have received it. Evidence was produced to support both claims. The order was placed by the

TABLE NO. 1—CASUALTIES TO PASSENGERS, EMPLOYEES, AND OTHER PERSONS.

	Passengers.	Employees on duty		Employees not on duty.			Other persons not trespassing.		Trespassers.		Total persons.	
		Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	
Collisions	19	1,000	53	704	1	11	1	19	4	78	1,739	
Derailments	9	654	34	396	1	3	1	5	9	50	1,067	
Accidents to trains, cars, or engines, except collisions, derailments and boiler explosions	34	6	142	..	..	..	8	..	..	6	184	
Bursting of, or defects in locomotive boilers or boiler attachments.	3	12	234	..	..	..	1	..	..	12	238	
Total train accidents.	28	1,691	105	1,476	2	14	1	33	10	14	146	3,228
Accidents to roadway or bridges not causing derailment, such as fires, floods, landslides, explosions, etc.	10	4	31	1	2	1	3	2	..	4	46	
Coupling or uncoupling cars (does not include accidents with air or steam hose) . . . . .	..	55	738	..	..	..	..	..	..	..	55	738
While doing other work about trains (not in shops or engine houses) or while attending switches . . . . .	..	30	4,232	..	..	..	..	..	..	..	30	4,232
Coming in contact, while riding on cars, with overhead bridges, tunnels, or any signal apparatus, or any fixed structure above or at the side of the track.	4	18	314	1	4	..	2	3	14	22	338	
Falling from cars or engines.	9	46	95	1,325	4	13	..	11	83	108	191	1,503
Getting on or off cars or engines.	19	599	39	1,930	9	75	6	33	108	381	181	3,018
Other accidents on or around trains not here named.	1	688	6	184	..	31	5	91	3	47	15	1,041
Being struck or run over by engine or car at stations or yards.	7	27	183	327	18	32	29	76	237	209	474	671
Being struck or run over by engine or car at highway grade crossings. . . . .	..	..	2	6	2	3	143	495	44	31	191	535
Being struck or run over by engine or car at other places. . . . .	..	1	104	95	21	8	15	27	614	297	754	428
Other causes	2	103	9	107	21	27	29	346	19	69	60	652
Total other than train accidents.	38	1,478	542	9,289	57	195	228	1,084	1,113	1,156	1,978	13,202
Grand total	66	3,169	647	10,765	59	209	229	1,117	1,123	1,170	2,124	16,430

despatcher just prior to his going off duty and was duly noted by the despatcher who relieved him. A few minutes later No. 7 was ready to leave F, and the signatures of that crew to other orders was transmitted to the despatcher, who then authorized the train to proceed, overlooking the fact that signatures for the order fixing a meeting point with No. 6 had not been given him. It is the conclusion of the superintendent that the despatcher who sent this order was in error in stating that it had been acknowledged by the operator at F, confusing the acknowledgement made by the other office to which it was also sent. The despatcher and the operator concerned are reported as reliable, careful men.

Collision No. 8, between eastbound and westbound freight trains, was due to the mistake of a telegrapher of 20 years' experience; he failed to deliver an order to the westbound train. As that train approached his station he called the despatcher and announced the fact to him. The despatcher replied by instructing the operator to take a train order, and the operator began copying this order (order No. 2) with the impression in his mind that it was for the train then approaching. He already had on his desk an order (order No. 1) for this train and had

his train-order signal displayed, indicating stop. When he had copied order No. 2 sufficiently far to see that it was not for the train then approaching he at once changed his outdoor signal to indicate clear, forgetting order No. 1.

Collision No. 13, in which a passenger train standing at a station was run into at the rear by a following passenger train, killing 6 passengers and injuring 46 passengers and employees, was due to disregard of signals by the engineman of the second train. This train had passed *two* automatic signals set against it, and it struck the standing train while still running at high speed. The engineman is 54 years old and had a clear record for 30 years. It is the belief of the superintendent that the engineman had been unconscious for perhaps 10 minutes immediately prior to the collision; and, from the statement made by the engineman and from other evidence, that this condition was due to a mild attack of epilepsy. The fireman had been in service on passenger trains 10 months. The train was on an ascending grade and he was attending to the fire; and he neglected to comply with the rule which requires him to communicate by word of mouth with the engineman on approaching each block signal. He is held negligent also for not having observed that

TABLE NO. 2A.—CAUSES OF 28 PROMINENT TRAIN ACCIDENTS.

[NOTE.—R stands for rear collision; B, butting collision; M, miscellaneous collisions; D, derailment; P, passenger train; F, freight and miscellaneous trains.]

COLLISIONS.

No.	Class.	Kind of train.	Killed.	Injured.	Damage to engines, cars and road-way.	Reference to record.	Cause.
1	M	F and F.....	6	3	\$100	15	Freight cars, carelessly left standing on main track, run into at night by engine carrying passengers on front end. Six of these passengers were killed. This collision occurred on a new road a few miles long, used mainly for the transportation of freight.
2	B	P and F.....	1	5	4,000	31	Engineman in charge of engine without train encroached on time of regular passenger train; watch 10 minutes slow; comparison of watch with standard clock had been neglected.
3	R	F and F.....	1	2	4,500	8	Absence of tail lights on standing train, a car which was out of order having been put behind the caboose. Also, the men in charge of standing train had depended on the protection of a fusee; but they had been detained, by air brakes sticking, until the fusee had burnt out.
4	B	F and F.....	0	2	5,000	50	Failure to deliver meeting order. (See note in text.)
5	R	F and F.....	2	0	6,700	46	Disregard of two automatic block signals by engineman and front-end brakeman, both of whom were killed. It is believed they were asleep.
6	R	P and F.....	2	32	7,308	9	Freight encroached on time of passenger train at meeting point. Conductor and engineman are said to have "assumed" that the passenger would be late. Operator failed to deliver order.
7	B	P and P.....	0	66	7,700	47	Operator, 20 years in service, failed to deliver order. (See note in text.)
8	B	F and F.....	2	2	9,358	11	Operator, 21 years old, 3 years in service, accepted order after train had passed.
9	B	F and F.....	0	3	9,910	10	Train standing at station, 5:36 a. m., in fog, not protected.
10	R	P and P.....	2	20	12,802	1	Switch thrown under rear car of moving passenger train. Car ran partially on siding and collided with a locomotive. One passenger car destroyed by fire, started by ignition of gas. The superintendent was unable to fix the responsibility for the throwing of the switch.
11	M	P and F.....	0	0	13,838	30	Freight standing at station not protected by flag.
		Total.....	29	245	162,105		Disregard of automatic block signals. (See note in text.)
							Freight encroached on time of passenger train. (See note in text.)
							Faulty time-interval regulations and failure to protect train by fusees. (See note in text.)

DERAILMENTS.

1	D	P.....	0	8	\$2,100	24	Engineman "lost his bearings." (See note in text.)
2	D	F.....	1	1	2,144	60	Engineman deceived by signal light, the color of which had been modified by the rays of electric headlight. (See note in text.)
3	D	F.....	1	0	2,600	59	Disregard of signal at derailing switch; engineman asleep (6:15 a. m.).
4	D	P.....	0	2	4,000	61	Rock fell on track from bank 300 ft. above. Track had been watched for many years, and in unsettled weather it was patrolled; but at the time of this accident the ground was very dry and the patrolman had been taken off.
5	D	P.....	1	17	4,224	26	Broken rail. The road at this point has automatic signals, but the break in the rail did not affect the signal for the reason that it was close to the end of the rail, between the ends of the bond wire.
6	D	P.....	0	56	5,000	35	Low joint in track, due to heavy snow and rain; speed of train 50 miles an hour.
7	D	F.....	0	0	6,550	25	Failure of journal, due to overheating. Wreck occurred in tunnel, blocking road 4 days. Conductor and brakeman held blameworthy for not having detected the heating of the journal.
8	D	P.....	0	4	10,000	42	Derailing switch (in sidetrack); it had been opened by some cause undiscovered.
9	D	P.....	1	10	13,300	62	Malicious obstruction of track.
10	D	P.....	0	7	14,610	44	Rock fell from bank on track; the rock struck the track just as the train was passing, and the engines of the train were not derailed.
11	D	F.....	0	0	16,000	64	Excessive speed on descending grade.
12	D	F.....	2	0	16,399	17	Excessive speed.
13	D	P.....	8	16	22,000	53	Broken driving wheel axle; 4 cars fell through a trestle bridge. The axle was of high-grade steel. It broke at the end of the journal next to the wheel fit. The weight on this journal was 18,000 lbs. The diameter of the axle at the wheel fit was 9 1/2 in., and of the journal 8 11/32 in., which is 5/32 in. less than the diameter when it was new.
		Total.....	14	121	118,927	....
		Total collisions and derailments.....	43	366	281,032	....

the speed of the train was excessive, in view of the fact that it was approaching a large station.

Collision No. 14 was a case of a passenger train running into the rear of a freight which was entering a side track, having been delayed in this movement because of the pulling out of a drawbar. As the freight approached the switch, where it was to enter the siding, the rear brakeman threw off three fusees, but the train was delayed because of the failure of the drawbar, and before it could move two of the fusees had burned out. The third, burning yellow, was at a point about 1,000 ft. in the rear of the freight. The men in charge of the freight are held responsible for the collision, in not having given the passenger train effective stop signals; yet the engineman of the passenger train (who was killed) could have seen the tail lights of the freight 1,650 ft. before reaching them; while the evidence shows that he did not apply the brakes until he was within 200 to 350 ft. of the freight.

Collision No. 15, in which two passengers were killed, was a case where a regular passenger train ran into the rear of a preceding passenger train which was just about to enter a sidetrack to clear the main track for the other train. Both trains were of the same class, but the leading train was behind time and fell back on the time of the one that was following, while the schedule of the following train was faster than that of the other. At T, about 10 miles back of the point of collision, the second train was 10 minutes behind the first. On approaching C, where it was to enter the sidetrack, the leading train was slackened to allow one of the trainmen to go ahead and set the switch for the sidetrack. To provide against a collision the rear brakeman dropped a lighted fusee at a point one mile short of the switch, but the fusee did not burn. He immediately dropped another, and that also failed. He then went into the car to get a third fusee, but by that time the train had come to a stop, and before he was able to get back with a flag the collision had occurred. The brakeman says it was not over one minute after his train stopped before the following train appeared. On account of a dense fog he could see back not more than 150 to 250 ft. It was found that one of the fusees which had been thrown off had been burned about 1 in. The testimony of the brakeman regarding the weather is contradicted by other witnesses, who say that, although the atmosphere was a little hazy, objects could be seen for a half mile. The collision occurred at 7:25 a. m.

Derailment No. 1 occurred at 7 p. m. during a severe wind and snow storm. The engine and nearly the whole of the cars in a passenger train were thrown off the track at a derailing switch, and the engine and mail car were overturned. In consequence of the blinding snow, the engineman had passed through a cut about a half mile back without observing the location, and then when his engine struck a snowdrift a short distance from the point where he was derailed, he thought he was then passing through the cut; and he had not shut off steam at the time when the engine went off the track. The towerman in charge of the derail saw the train coming and endeavored to close the derail, so as to avoid ditching the train, but he was unable to close it, as the points were clogged with snow. The section foreman had just come on duty, to clear the switches of snow for evening trains, but had not yet reached this particular derail. The derailed cars were of steel and were only slightly damaged.

Derailment No. 2 occurred to a freight train moving along a passing track. The train was not kept under complete control, and went off the track at the derailing switch at the outgoing end of the passing track. The accident occurred at 7 p. m. The engineman said that the electric headlight of the engine caused the purple light (indicating "stop") at the derailing switch to look white (which would indicate "all clear"). The light was dim, however, and the engineman has been censured for not bringing his train to a stop when he had ground for suspicion that the track was not in proper shape for the passage of his train. After the accident, a test was made with an electric head-

light, shining on a purple light, and it was found that the purple light appeared to be white until the observers had reached a point within about 200 ft. of it, thus confirming the engineman's statement.

Electric railways reporting to the commission had 61 persons killed during the quarter and 696 injured; and there were 30 collisions and 52 derailments. Train accidents are charged with only one fatality—one employee killed in a collision. The total number of passengers killed from all causes was 9, and of employees 5 (none in industrial accidents). The number of trespassers struck or run over by cars was 41; 20 killed and 21 injured.

DUCTILITY IN RAIL STEEL.*

BY P. H. DUDLEY.

The phrase "ductility in rail steel" does not, as often supposed, express equal physical properties in metal for rails of different chemical composition or different methods of fabrication, and for different conditions of service. Bessemer-steel rail sections of high phosphorus, even with low carbon content, are more fragile in the distribution of rapid large bending moments than the low-phosphorus medium-carbon steel of basic open-hearth rails. There is also a marked difference in the freedom from fractures under similar service between brands of steel made under the same specifications. Rails which are satisfactory in warm climates fracture more frequently in colder climates.

Iron forms the economic basic element of steel, its ductility being utilized with the metal manganese and the metalloids carbon and silicon to produce an alloy of double the elastic limit and ultimate strength of the best wrought-iron rails. The iron rails were adequate for the installation of the railways, but were so rapidly impaired by the equipment of 1860 and 1870 that they were replaced by Bessemer-steel rails, which have since rendered possible the present extensive railway systems of the world.

Owing to the exhaustion of the available low-phosphorus ores, Bessemer rail steel is now of necessity a high-phosphorus and low-carbon alloy, the mean carbon being about 0.50 manganese about 1.00, and silicon 0.10 to 0.20 per cent.† The impurity of phosphorus is limited to 0.10, while that of sulphur was limited formerly to 0.075 or 0.08 per cent. The manufacturers this year charged for this limitation of sulphur five cents extra per hundred pounds and it has been omitted from most specifications, though it is generally required that its content be 0.05 per cent.

Plain basic open-hearth rail steel is usually a low-phosphorus and medium-unsaturated-carbon alloy, as most of the phosphorus has been reduced by this process from its content in the ores and iron to 0.04 per cent. or under. This permits, in this class of steel rails, carbon of 0.63 to 0.75 per cent. in combination with the same percentage of manganese and a silicon content of 0.10 to 0.20 per cent.

The metalloid carbon (under 10 per cent.) when alloyed with iron increases its tensile strength, but, as would be expected, lessens at the same time its ductility by increasing its viscosity to strains, yet does not increase its brittleness rapidly so long as the mineral aggregates elongate after passing the elastic limit and have a decided reduction of area at the necking or point of fracture. Steel which is rendered granular from any condition of chemical composition or fabrication partakes more of the nature of brittle solids than of ductile tough alloys.

Manganese also increases the tensile strength of the metal, although to a less extent than carbon when its amount is under 1.25 per cent. It is not an impurity, as frequently stated, but is a necessary element in oxidation processes to reduce the percentage of oxides in the completion of refining the steel.

*A paper read before the American Society for Testing Materials, Atlantic City, N. J., June 27-July 1.

†The chemical compositions refer in all cases to 100-lb. rails.

Silicon is also a requisite element to increase the solidity of the metal, and in the small percentages which obtain in Bessemer or basic open-hearth steel, it adds little if any to the tensile strength of the alloy.

Phosphorus is an embrittler, especially with high carbon. It increases the viscosity of the steel and reduces its capacity to distribute rapid strains or those of large magnitude before fracture occurs, particularly in low temperatures. Therefore, when as much as 0.1 per cent. of this impurity is present the percentage of carbon must be limited for Bessemer rail steel practically to 0.5 per cent., with the necessary manganese. Phosphorus, it is said, may exist in rail steel in two or more compounds, one not being considered harmful to the steel. Several investigations have indicated the same result, but have not disclosed any direct method of fabrication to control the harmfulness of a part of or the entire phosphorus content. It is therefore considered best to reduce the total phosphorus in the ores in this country by the basic open-hearth process, and to replace the embrittling properties of a large content of phosphorus by a higher percentage of carbon. This enables the metal to withstand greater tensile and impact strains and distribute them in the rail section as a girder in a shorter time without fracture than is possible for the Bessemer metal with the higher phosphorus content.

Sulphur is an impurity and renders the metal hot short in rolling, producing checks and cracks, while the greater portion of the sulphur unites with the manganese forming manganese sulphide, which is occluded by the metal as a foreign substance, preventing its welding, and breaking up the continuity of its structure. Silicates which should have escaped from the bath of molten metal are also often occluded in the steel. These defects often become the incipient points of detailed fractures due to the gradual deformation of the section by the repetitions of passing wheel loads.

Tests butts from Bessemer rail steel, carbon 0.50, manganese 0.90 to 1.10, phosphorus about, but under 0.10, silicon 0.13 to 0.15, show under the drop-testing machine a range of ductility from 6 to 18 per cent., although the majority of the tests give from 10 to 18 per cent.[‡] There are some heats or groups of heats in which the ductility drops to 5 or 6 per cent. and in which the butt breaks under a second blow. The tests of the butts, unless otherwise indicated, refer to the crop from the top of the "A" rail.

Test butts from basic open-hearth rails, carbon 0.63 to 0.75, with about a similar content of manganese, phosphorus 0.04 or under, silicon 0.15 to 0.20, usually show under the drop-testing machine a range of ductility from 6 to 18 per cent., while an occasional melt gives 20 to 25 per cent. Twenty thousand tons of special basic open-hearth supersaturated steel rails, carbon 0.80 to 0.90, phosphorus under 0.03, with a small percentage of titanium added in the ladle, which have been rolled recently, show a ductility of 6 to 18 per cent. and are now in service. The rails seem tough as a girder, and abrasion tests indicate that they will show great resistance to flange abrasion on curves.

Melts of open-hearth rails for the New York Central Lines contain from 10 to 24 ingots and make from 90 to 180 rails. Three butts are tested from different ingots of each melt; one is from the second ingot teemed, one from the middle of the melt, and a third from the ingot before the last one poured. To pass the melt each butt must show a ductility of at least 5 per cent. in two consecutive inches upon the base or of 6 per cent. in one inch, while in one butt the ductility of the steel is totally exhausted. The butts for this record are selected in rotation from the different ingots and the range for the melts is thus ascertained. The tests as a rule indicate that the ductility is quite uniform for each melt. The exceptions can usually be

traced to colder rolling, differences in heating, and sometimes to brittleness of the metal itself.

The size and weight of the ingots for open-hearth steel vary at different mills. The smallest ingot for a three-rail length of 100-lb. section weighs 3,934 lbs. The ingots for six-rail lengths of 100-lb. section at another mill weigh 8,200 lbs. The ingots at a third mill weigh 12,500 lbs. each and after more than a 20 per cent. discard are bloomed for eight 100-lb. rails, cut in two-rail lengths and reheated before rolling. These large ingots, with nearly sixty reductions in size to that of the section of the rail, receive so much mechanical work upon the metal that the effects of the carbon are intensified and the ductility is reduced 2 or 3 per cent. below that of rails of similar composition from smaller ingots. The slightly reduced ductility will give greater resistance for curve abrasion and still be sufficient for the section as a girder.

The ductility of ferro-titanium Bessemer rails, with 0.1 per cent. of metallic titanium added to the bath, carbon 0.60 to 0.70, manganese 0.40 to 0.70, though usually confined under 0.60, silicon 0.10 to 0.18, ranges from 6 to 15 per cent., showing a decided softening of the effect of the phosphorus content by the titanium and lower manganese. These rails are now to be submitted to extensive service tests to see whether or not the expected benefits will be secured in practice.

The value of 8 to 12 per cent. ductility in rail steel may be modified considerably in the fabrication of the rails by the checking of the columnar structure in blooming, producing large percentages of second quality rails. These checks do not roll out completely, and while many rails are rejected, some checks under the scale are invisible in the base of the rail and weaken it transversely, thus losing in effect the ample ductility intended by the chemical composition. It has been found that under high-speed trains of heavy wheel loads the half-moon or crescent breaks which occur in the base of the rail start from these incipient checks in the metal near the center of the base and in low temperatures generally develop as detailed fractures. When the "seconds" run from 5 to 15 per cent. of the output, this type of break occurs in rails in which the checks were so minute as to be invisible, and therefore escape detection in the rails at the mills.

Some years since, when the output of the mills was large and the steel not well deoxidized before teeming the ingots, the half-moon fractures were confined mostly to the "A" rails; but they are now more common in the lower rails of the ingots, at least of some brands. The metal in the present blooming trains does not crack or check as much in the upper part of the better deoxidized open-hearth or Bessemer ingots as it does under the first heavier drafts for the lower and larger part of the ingots. The checks have not occurred to as marked an extent in the open-hearth ingots, making only 1 or 2 per cent. of seconds, as formerly in the Bessemer ingots, for the reason that the purer open-hearth metal is not as hot-short as the less deoxidized plain Bessemer metal. It is noticed, however, that in open-hearth rails the greatest number of seconds from some of the mills, even of the 1 or 2 per cent., are from the last rail in the ingot. While the mills are designed to produce rails, the differences in many of the details of furnace and mill practice have some influence upon the ductility which may be secured and utilized from a given composition of metal.

The New York Central and Hudson River, and the Boston and Albany Railroad Companies, have had a large experience concerning the requisite ductility of rails as girders to carry and distribute the wheel loads and also to resist flange abrasion upon curves under heavy traffic. Of the many thousand tons of Bessemer rails of 0.06 per cent. phosphorus and 0.60 to 0.65 per cent. carbon which I commenced to roll in 1891 and continued until the exhaustion of the low-phosphorus ores in 1902, 90 per cent. were required to exceed a minimum ductility of 5 per cent. per inch as shown under the drop test, which in fabrication by the manufacturers was raised to 95 per cent. The maximum

[‡]The method of determining the ductility in rail steel is described in my paper on Elongation and Ductility Tests of Rail Sections under the Manufacturers' Standard Drop-Testing Machine. *Proceedings*, Vol. X, 1910, pp. 223 ff.

ductility was about 18 per cent., and the average was over 12 per cent. The minimum ductility was 4 per cent. per inch for acceptance of 10 per cent. of the rails, though confined by good mill practice to 5 per cent. of the output. The rails proved to be tough and but few fractures have occurred in service, while many are still in the tracks.

Six-inch, 100-lb. rails made in 1894, after sixteen years of service carrying 250,000,000 tons of traffic with a loss of less than 0.125 in. on the head, were tested early this year under the drop, base down on the supports. One butt gave 6 per cent. elongation before it sheared through the bolt holes and a butt from another heat gave 8 per cent. The metal in the head of either rail, like thousands of others in the track, did not flow to the sides but wore uniformly, owing to the efficient support of the metal of high elastic limit underneath the bearing surface. The resistance to flange abrasion was excellent, rails lasting six to ten years upon three-and four-degree curves under heavy traffic. Rails of the same sections containing 0.10 per cent. phosphorus and 0.50 per cent. carbon used to replace them, cut out upon the same curves in two or three years, although there has been some increase in the traffic.

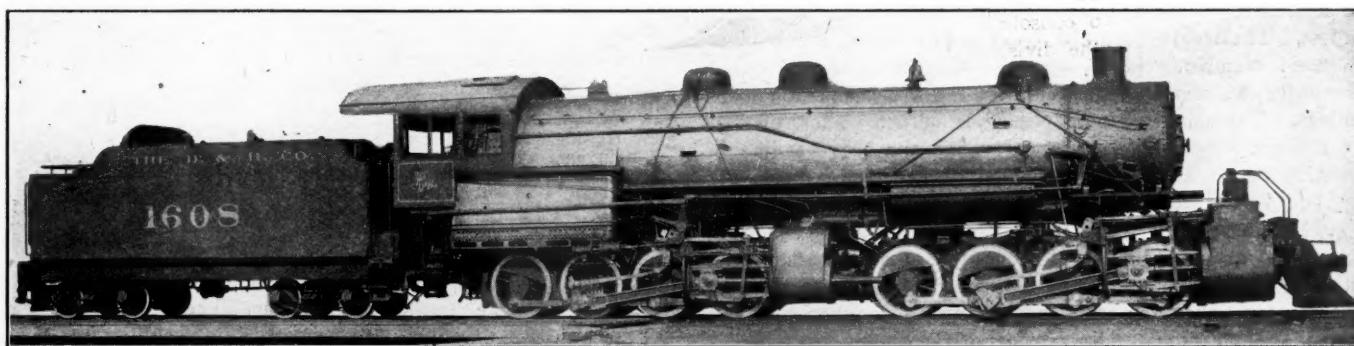
The minimum ductility of the metal has been raised from 4 to over 5 per cent. per inch to insure malleability as well as ductility for the increased service under the present wheel loads and higher speeds. This is for the purpose of meeting the present decreased time factor in distributing the larger and more rapid

pletely fractured at the first occurrence. Broken rails have been found having in the base two distinct oxidized checks which had occurred several months apart and not until a third excessive wheel load at some subsequent date was the rail completely fractured. There are also many fractures which show that the impact of the passing wheel was so quick and great as to render ductile metal fragile without exercising its ductility in the least. This has led to a general investigation of the relations of the passing equipment to the rails and roadbed, as it is their combination which forms the means of transport.

MALLET SUPERHEATER LOCOMOTIVES; DELAWARE & HUDSON.

In June, 1910, the Delaware & Hudson received six Mallet locomotives from the American Locomotive Company, which at the time of their construction were the most powerful locomotives in the world. They were put in pusher service on the 18 mile grade of the Pennsylvania division between Carbondale, Pa., and Arrarat station, where they have been in operation ever since. From W. C. Tower, Carbondale, to Forest City, a distance of 5½ miles, the grade is 1.36 per cent., and from the latter point to Summit, it averages about .8 per cent. with a number of 6 deg. and 7 deg. curves.

Recently four more articulated locomotives were received from the same builders, which are nearly duplicates in design



Mallet Superheater Locomotive; Delaware & Hudson.

alternating positive and negative bending moments in the rail as a girder under the moving wheel contacts of the heavier loads and higher speeds, particularly in freezing temperatures.

It has been instructive to note that new rail butts at 60 deg. F. would withstand 2,000 lbs. falling 16 ft. Similar butts at 0 deg. F. would fail when an 8-ft. drop was exceeded, yet under the 16-ft. drop they showed by their curvature that a permanent set and about one-half of the elongation had occurred in the metal as found for a 16-ft. drop before fracture. The cold had increased the viscosity of the metal; therefore its resistance to flow, combined with the reduced time factor for the distribution of the greater energy and speed of impact of the higher drop, started the rupture of the extreme fibers in the base of the rail before the stress could be distributed through the entire section, and fracture consequently took place. Similar conditions occur in the rails in the track which are deflected from the trackman's unloaded surface to the "general depression" under the total loads of the wheel bases of the locomotives or cars, with specific deflections in the rails under the passing wheel contacts.

The heavy wheel loads of slow freight trains with a large time factor to distribute the stresses through the sections as girders, do not check or fracture as many rails as similar wheel loads at higher speeds with greater generated wheel effects and with less time for their distribution through the rails to the cross-ties, ballast, and roadbed. Oxidized flaws are often found in fractured rails, showing that a minute check had been caused by the maximum intensity of the wheel effect, but was so quickly relieved by the passing of the wheel that the rail was not com-

of the first lot except that they are equipped with the Schmidt loop type fire tube superheater, which provides a superheating surface of 1,106 sq. ft. One of these later engines is shown in the accompanying illustration. Except for modifications in the construction of the boiler but very little change from the original design, shown in the *Railway Age Gazette* of May 27, 1910, was necessitated by the application of the superheater. In the non-superheater design the high pressure steam pipes are connected to the branch pipes in the smoke box and extend back underneath the running boards to the high pressure cylinder; consequently, no change was necessary on account of the application of the superheater. Extended piston rods are applied to all pistons and the rods of the high pressure valves are also extended in the superheater design. There is also a difference in the valve setting between the two classes of engines. The valve in both cases has a travel of 6-in. In the superheater engine the high pressure valve has a 1-in. steam lap, a 3/16-in. lead and a 5/16-in. exhaust clearance. The low pressure valve has the same lap and lead and a 3/8-in. exhaust clearance. In the case of the non-superheater engines the high pressure valve has a 1 1/16-in. lap, a 3/16-in. lead and a 5/16-in. exhaust clearance, while the low pressure valve has a 1-in. steam lap, a 5/16-in. lead and a 7/16-in. exhaust clearance. The boiler of the engines, here illustrated, is fitted with 270 tubes, 2 1/4-in. in diameter and 24-ft. long, and 42 flues 5 1/2-in. in diameter.

Shortly after the first lot of engines went into service tests were made to determine their fuel and water consumption as

compared with the class E. 5 consolidation locomotives whose place they took in pusher service. The consolidation locomotives have a total weight of 253,000 lbs., 223,000 lbs. on driving wheels and a tractive effort of 49,700 lbs. Observations were taken of several runs made by the same two class E. 5 locomotives working together as pushers, and also of locomotives of 1,600 and 1,605 of the articulated type, working separately. In order to obtain the fairest basis for comparison only the results of those runs in which conditions were most nearly alike were tabulated—four in each case. The general average showed that the articulated locomotive hauled within 2.7 tons as much as 2 consolidation locomotives together at approximately the same speed, and burned 44 per cent. less coal. From records of the fuel consumption of the articulated locomotives covering the time since they have been in service, J. H. Manning, superintendent of motive power, states that they have maintained the averages shown by the tests. Similar tests will be made of the superheater locomotives, which will permit of interesting comparisons with the locomotives using saturated steam.

An analysis of these figures, and a consideration of the causes which produce the economy shown, bring out some interesting points as to the saving affected by the use of a single unit of great power instead of two or more units of less power in handling a given amount of tonnage. For instance, the total weight in working order of the articulated locomotive and tender is approximately 97 tons less than the aggregate of the two consolidation locomotives with their tenders. The length of the division is 18.7 miles, which gives in round numbers, 1,800 ton-miles less for the articulated locomotive per trip as compared with the 2 consolidation locomotives. The consolidation locomotives burned 68 lbs. of coal per ton-mile on the average, consequently the above saving in ton-miles means a resulting reduction of 1,225 lbs. of coal per trip, or 6.4 per cent. of the average total amount of coal burned (19,074 lbs.). On the other hand, both classes of locomotives have approximately 100 sq. ft. of grate area; consequently, with the single unit there is 100 sq. ft. less grate area to consume coal when the train is standing on a siding. It will be readily appreciated that considerable economy of fuel results from this cause. The tests showed that the consolidation locomotives burned an average of 55.8 lbs. of coal per sq. ft. of grate area per hour. Assuming that the rate of combustion is half of this amount, or 28 lbs., when standing on a siding, and that in the 18 miles there is an average lost time of 20 minutes, which is a very conservative figure, the saving in coal would be 933 lbs., or 4.89 per cent. of the total coal burned.

An excellent system of operating and handling the Mallett locomotives has been adopted. In engine house work the Mallet engines are segregated from the general work. A building was erected at the end of the engine house and a number of tools were installed. Night and day mechanics were selected to work on the Mallett locomotives. Their whole time is not put in on the Mallets, but the understanding and organizations is such that when there is such work to do they are the men who look after it.

When overhauling is necessary the articulated locomotives are, of course, taken over to the shop, which is about 100 yards from the engine house. At the shop a drop table has been installed that permits of dropping 4 pairs of drivers at one time. With this device all the wheels of the articulated locomotives can be removed in 20 minutes after they are ready to be taken down.

As far as the operation is concerned, a maximum speed limit of 15 miles an hour, both working under load and coming down the grade light has been fixed. All the articulated locomotives are equipped with speed recorders and the rule in regard to speed limit is rigidly enforced. Any engineer exceeding the speed limit is disciplined, and as a result the rule

is universally observed. The locomotives are run forward up the hill for 30 days and then turned and run backward for an equal length of time, thus equalizing the flange wear on the tires of the front and back systems. There can be no doubt that this careful system of operation contributes largely to the successful service which these locomotives are giving.

The general dimensions of these locomotives are as follows:

General Data.	
Type	0-8-8-0
Service	Freight
Fuel	Bit. coal
Tractive effort (compound)	105,500 lbs.
Tractive effort (simple)	126,600 lbs.
Weight in working order	457,000 lbs.
Weight on drivers	457,000 lbs.
Weight of engine and tender in working order	625,800 lbs.
Wheel base, driving	40 ft. 2 in.
Wheel base, rigid	14 ft. 9 in.
Wheel base, total	40 ft. 2 in.
Wheel base, engine and tender	75 ft. 7 1/4 in.
Ratios.	
Total weight \div tractive effort	4.33
Tractive effort \times diam. drivers \div heating surface	963
*Tractive effort \times diam. drivers \div equiv. heat. surf.	741
Total heating surface \div grate area	55.98
*Total equiv. heating surface \div grate area	72.57
Firebox heating surface \div total heat. surface, per cent.	6.3
*Firebox heating surface \div total equivalent heating surface, per cent.	4.86
Total weight \div total heating surface	81.7
*Total weight \div total equivalent heating surface	63
Volume equivalent simple cylinders, cu. ft.	26.1
Total heating surface \div vol. cylinders	214
*Total equiv. heating surface \div vol. cylinders	278
Grate area \div vol. cylinders	3.83
Cylinders.	
Diameter	26 in. & 41 in.
Stroke	28 in.
Wheels.	
Driving, diameter	51 in.
Driving, journals, main	10 in. x 12 in.
Boiler.	
Style	Conical connection
Working pressure	220 lbs.
Outside diameter of first ring	90 in.
Firebox, width and length	114 in. x 126 in.
Tubes, number and diameter	270, 2 1/4 in.; 42, 5 1/2 in.
Tubes length	24 ft.
Heating surface, tubes	5,245 sq. ft.
Heating surface, firebox	353 sq. ft.
Heating surface, total	5,598 sq. ft.
Heating surface, superheater	1,106 sq. ft.
*Heating surface, total equivalent	7,257 sq. ft.
Grate area	100 sq. ft.
Tender.	
Tank, style	Water bottom
Frame	Steel channels
Wheels, diameter	33 in.
Water capacity	9,000 gals.
Coal capacity	14 tons

*Total equivalent heating surface equal total heating surface (5,598) plus 1 1/2 times superheating surface.

LIGHTNING PROTECTION.

The problem of adequate lightning protection is a most serious one with the Canadian Pacific on the portion of the line between Lake Superior and the Rocky Mountains on account of the excessive severity of the lightning in this district. I might say that we are "between the devil and the deep blue sea." If we use sufficient arresters to take care of the frightful discharges, we most likely will kill the telephone circuit by having so many "traps for bugs." We have been using in the station where the fone line is looped, four Argus arresters, without fuses, on the four ends of the wires, and two Argus arresters with fuses on the bridge wires to the fones and selector.

At stations where the circuit is only legged in we have two Argus arresters with fuses. At the despatcher's office, besides the Argus arresters we equipped the first three poles from the office with O'Connell pole arresters. In some sections this protection seems to be adequate, the circuit being worked right through storms, but in the district above mentioned it does not appear to be sufficient, my reports showing that at times the telephone has to be abandoned for an hour or more on account of lightning. There have been some interruptions on account of the pole arresters, and this year we are trying out the Branch office and pole arresters to the same extent as the former equipment.—W. J. Camp (C. P. R.).

General News Section.

The division superintendents of the Intercolonial Railway have had their salaries increased to \$2,700 a year each; the salaries heretofore having been at different rates, averaging about \$2,400.

The International Railway Fuel Association has published the proceedings of its third annual convention, held at Chattanooga, Tenn., May 15 to 18 inclusive. The volume is handsomely bound in red leather, contains 235 pages, and is well illustrated.

A pension system has been adopted on the Oregon Short Line, the plan being the same as that which has been in effect for several years on the Southern Pacific and other lines in the Harriman system. Throughout the system the number of persons now on the pension rolls is 420.

Governor Dix of New York has vetoed a bill to permit the Union Railroad Company, New York City, to consolidate with any other street surface railway in Westchester county. The Governor disapproves the bill because it allows the consolidation without the consent of the Public Service Commission.

Suit has been begun at San Bernardino, Cal., against the Atchison, Topeka & Santa Fe for violation of the California full crew law, the offense charged being the running of a passenger train of four cars with only one brakeman. The road claims that, one of the four cars being a baggage car, the requirement of the law does not apply.

The Bureau of Navigation monthly shipbuilding return says that five wooden sailing vessels, with a gross tonnage of 1,566 tons, were built in the United States during July. During this period 133 wooden steam vessels, with a gross tonnage of 3,912 tons, and five steel steam vessels, with a gross tonnage of 9,958 tons, were also built.

Suit has been filed by the state of Kentucky against the Southern Pacific Company for \$125,000 additional franchise taxes, the petition alleging that while the company's books show gross earnings of \$145,000,000 and net earnings of \$57,000,000, it reported gross earnings at \$45,000,000 and net earnings at \$36,000,000 to the state auditor.

The Interstate Commerce Commission, acting on a complaint that regulations for the transportation of explosives and other dangerous articles are unreasonable, is to investigate the general subject, both as regards the regulations of the express companies and those of the railway companies; the first hearing to be held in Washington, October 11.

The Baltimore & Ohio has ordered of the United States Electric Company, of New York, Gill selector telephone train despatching outfits complete for 40 stations, to be used on the telephone despatching circuit from Clarksburg to Salem, W. Va. A message circuit will parallel the train wire. This installation will complete the train despatching circuit from Grafton to Salem.

The Maine Central has opened war on tramps. Conductors, both passenger and freight, telegraph ahead to stations where there are policemen, calling for officers to be ready to make arrests; and the tramps are taken into court and sent to jail for 30 to 90 days for evading fares. Magistrates in New York and other states who are reluctant to impose a sentence even of 30 days might do well to send for the records of some of those 90-day cases.

The Chicago Great Western has adopted an accurate coal weighing system by which a record will be kept of every pound of coal used throughout the system, and it is expected that the present cost of fuel—\$1,500,000 annually—can be reduced 10 per cent. New scales will be put in at each of the company's twenty-three coaling stations, and reports will be made showing the average consumption of coal per locomotive mile and per ton mile.

The Missouri Pacific announces that beginning next Monday the general claim department, which has its office at St. Louis, will become a part of the office of the vice-president and gen-

eral solicitor and will no longer be a separate department. District claim agents will be appointed who will report to the heads of the legal departments of their respective districts, thus introducing division management into this department. All minor claims will be settled without the delay incident to sending the papers to the general headquarters.

The attorney general of the United States has begun suit in the federal court at Columbus, Ohio, to dissolve the alleged illegal combination in restraint of trade which has been established by the amalgamation of the Hocking Valley Railroad, the Toledo & Ohio Central and other roads, and three coal mining concerns. Among the defendants are the Lake Shore & Michigan Southern and the Chesapeake & Ohio, which two years ago acquired control of these Ohio roads, the Lake Shore taking the T. & O. C., and the Chesapeake & Ohio the Hocking Valley.

Governor Dix of New York has vetoed a bill which was passed by the legislature, recently adjourned, providing that a railway telegrapher must be 21 years old and must have had a year's experience as an apprentice. Governor Dix believes that the present law, making the minimum age 18, is a sufficient protection for the public; but adds that if a change ought to be made the Public Service Commission is the body that ought to make it. The Governor has also vetoed a bill which would require every engine running without a train to be manned by an engineman, a fireman and a flagman. He says that the regulation of a matter of this kind belongs to the Public Service Commission.

Ninety-two thousand seven hundred forty-seven dollars and sixty-five cents is the amount of a check issued by the Southern Pacific Company, at San Francisco, July 24, in payment of damages to W. R. Zibbel, who in a railway accident lost both arms and one leg. This we learn from the *San Francisco Bulletin*, which prints a facsimile of the check. This remarkably large verdict has been sustained by the Supreme Court of California. It is said to be the largest sum ever paid under such circumstances, which one may well believe. According to the *Bulletin* the company's first offer to the injured man was \$500. He sued in the court at Fresno and on the first trial was granted \$100,000. Fearing that this would be held excessive on appeal Mr. Zibbel agreed to accept \$70,000. The road, however, took the case to the highest court and put forth its best efforts to secure a reduction; but Mr. Zibbel now gets his \$70,000 with interest from December 31, 1906. The gross sum includes also the costs.

Committees representing the railways and commercial concerns interested in the proposed changes in the regulations affecting the size of trunks to be accepted by the roads as baggage, met in Chicago on August 7 with a view to reaching an agreement in the matter. Although nothing was decided at the conference, it was decided at a subsequent meeting of the railways' committee to postpone the date when the 40-inch limit will become effective to July 1, 1914, and to adopt a rule imposing a 45-inch limit, but not to put it into effect until July 1, 1912. While the commercial organizations and trunk manufacturers decided at a meeting on July 10 to ask that trunks the greatest dimension of which is as much as 50 in. be accepted free as baggage, and that the rule imposing this limit be not made effective until January 1, 1913, it is believed that they will agree to the concessions offered by the roads as outlined above. The extension of time will give interested shippers and trunk makers an opportunity to adjust themselves to the new rules.

Oil Burners in Alaska.

All the engines in use on the Copper River & Northwestern Railway in Alaska are being changed from coal to oil burners, owing to the impossibility of securing Alaska coal and to the fact that California oil can be secured more cheaply than American or Canadian coal. A contract has been entered into between the railway and the Standard Oil Company to furnish the fuel. The mining plants located in the Copper River region are also changing all of their furnaces to oil burners. The Alaska

Northern has solved the fuel problem in part by purchasing two gasoline motor cars which are run for passengers, light freight and express, making the run from Seward to the end of the line and back on the arrival of each steamer. The gasoline is bought in Seattle.

Dissatisfied Shopmen.

Shop men of the Southern Pacific are asking for shorter hours and higher pay throughout the lines of the system, and it is said that the brotherhoods who control these shop men are making or soon will be making similar demands on all of the roads west of the Missouri river. The Northern Pacific and the Great Northern have reduced the working hours in most or all of their shops. The International & Great Northern has closed its shops at Palestine. The Texas & Pacific has laid off considerable numbers of shop men in Texas and in Louisiana. On the other hand, the Missouri, Kansas & Texas has increased the working hours at its shops in Sedalia, and the Louisiana Railway & Navigation Company has ordered increases in the shop forces at all points on the road.

Railway officers in Chicago say that the roads throughout the West will present a united front in combating the demand of the shop men for increased pay. The present is a favorable time for them to meet a widespread strike. The presentation of the demands of the men has disclosed the formation of a new labor alliance, the "Federated Shop Trades." It is said that the shop men at Los Angeles on the Rock Island have completed plans to strike. A request has been received by the Illinois Central for a conference with a committee representing the so-called Federated Shop Trades; but it is said that the road will insist on treating with the unions individually instead of in a combined organization. A similar request addressed to the Rock Island is said to have been granted.

An Absent-Minded Engineman.

In investigating a collision which occurred at Salford on the Lancashire & Yorkshire, last June, Col. Drutt, of the British Board of Trade, found that the engineman of a special passenger train, not a regular runner on that part of the road, yet well acquainted with it, "for some reason or other got the impression that he was on the passenger track (of a four-track line) when he was really on the freight track"; and he ran past a stop signal and into a freight train. Only four persons were injured and none very seriously. Errors of this kind on the part of engineman have been reported on four-track lines in this country; but the curious feature of the Salford collision is that it occurred in broad daylight (about 6 p.m.); and, moreover, the line appears to have been straight, or nearly so. The signals were on bridges and each was fixed exactly over the line to which it applied. The signal which was wrongly taken was 21 ft. to the right of the one which in fact governed the track on which the train was traveling. The engineman had been on duty twelve hours, but with an interval of rest of about four hours.

The Pennsylvania and the New York Subways.

Samuel Rea, vice-president of the Pennsylvania Railroad, having studied the New York situation—which has been confused for several months and which still remains confused, except that construction work has been begun on Lexington avenue—comes out in a statement calling attention to the probability that the plans which seem to have been agreed upon by the authorities will result in putting on the city an enormous burden for the support of lines which for some years will have only a light traffic. He is disappointed that "the city is being committed to an extravagant subway system, which will serve the entire city and will not be self-supporting for 15 years after its construction, and before that time will have accumulated a debt of \$40,000,000, which will have to be paid by the taxpayers." Continuing, Mr. Rea says:

Idle and unprofitable millions having been invested in the Centre street loop and the Fourth avenue subway (Brooklyn), not a penny should be spent on the proposed subway system until the city is assured that the lines will have a reasonable chance of being profitable, and an operator is secured to operate the same at its own risk and not at the city's expense. The logical extensions to the present city subway will serve the public and

keep the city's interest therein paramount to all others, and this can be effected without the undesirable features of the extravagant plan now proposed. There are six important questions:

1. Has the city the basis for such a tremendous expenditure—\$160,000,000 to probably \$200,000,000—and yet meet its other needs without imposing an unusual tax burden? The mayor and the comptroller should publish the facts.

2. Is there any real present necessity for all the subway lines proposed, and can the same be profitably operated? The estimates already made of the revenues and expenses of the new subway system have shown what a long term of years must elapse before the proposed system will be free from operating losses, but they have not so clearly indicated when, in addition to these losses, the accumulated interest charges on the capital invested will be met; nor have they definitely shown the accumulated burden which the taxpayers must pay for at least a period of thirty or more years. The bankers and investors, who will be asked to provide for the city and the operating company about \$225,000,000 under the conditions proposed, will also do well to consider these estimates, and endeavor to save the city against the unfortunate results.

3. Can the city's credit be used and should it be used to guarantee either the Interborough or the Brooklyn Rapid Transit Company, or any other operator, against subway losses, or make a preferential payment to them out of subway operations at the expense of the citizens?

4. Can the citizens under present rapid transit conditions wait for at least five years without any relief? Should they be asked to do it? The present crowded rapid transit conditions are almost unbearable.

5. Can it be regarded as a final settlement of the situation to offer the proposed operator the cream of the short distance Broadway-Fifty-ninth street travel and not insist that in fairness it assume the operation of the much-needed West Side Seventh avenue subway?

6. Can the Pennsylvania and Long Island Railroads, the largest taxpayers of the city, be satisfied when the urgent necessities for the Seventh avenue subway, which would serve the Bronx, Brooklyn and Queens, are absolutely ignored and no provision made in this vast outlay for anything to relieve the situation? In addition to being the largest taxpayers they also carry 30,000,000 of citizens in and out of New York City yearly, and by other traffic do as much as any other corporation to maintain the commercial supremacy of New York City. Yet all of this has not been deemed sufficient to commend the building of a subway to their station for the public benefit as a part of the comprehensive subway system.

Citizens, taxpayers and investors in city securities need to give the situation urgent attention and try to save the city from any such wholesale expenditure of its capital as is now proposed, and confine the present subway program to providing imperative necessities.

Safety Committees on the Frisco.

Safety committees have been organized on the St. Louis & San Francisco for the purpose of reducing the number of deaths and injuries to passengers and employees. A central safety committee will have general supervision over this work, while committees have also been appointed for each division. The duties of the different committees will be to investigate defective conditions and careless practices and take necessary steps to remedy or improve them. If of general application the measures adopted by the division committees are reported to the central safety committee, and all recommendations approved by the central committee are submitted to the management. Each division committee will make periodical trips over its division on a special train, and each member of the committee while on the trip will be detailed to investigate some department of the service with which he is not familiar, he being more likely to notice dangerous conditions in a other than his own department. An account of the proceedings of the central safety committee will be furnished to the different committees, and bulletins will be distributed among the employees. The results will also be published in the employees' magazine. At the end of each year a prize will be awarded by the company to the division showing the greatest improvement and the fewest injuries in proportion to the work done.

Telegraphic Reports of Accidents.

The order of the Interstate Commerce Commission, requiring railways to report all fatal accidents by telegraph, appears to have been modified, the chief of the accident division having given assurance that fatal accidents to passengers or employees on or about trains will be the only class to which the telegraphic requirement will apply. Reports of trespassers killed on the road, of persons killed at highway grade crossings, of track men killed by trains, etc., may be reported by letter instead of telegram. Industrial accidents need be reported only in totals at the end of the month, as heretofore. The safety appliance inspectors who are assigned to the investigation of accidents are not authorized to summon witnesses or take testimony, but are to send in reports which will be in the nature of preliminary reports to enable the commission to decide whether or not it will hold a more formal investigation. Some roads have decided not to comply with the order of the commission calling for telegraphic reports until the legality of the order shall have been tested in the courts.

Railroad Chemists and Engineers of Tests.

A number of railway chemists and engineers of tests met at the Hotel Stratford, Chicago, on August 3 to effect an organization. For the present, the meetings will be informal in character, and the attendance will be confined to representatives of railway test departments and laboratories. H. F. Force, chemist of the Delaware, Lackawanna & Western, with office at Scranton, Pa., was elected chairman. W. A. Derby, acting engineer of tests of the Chicago, Burlington & Quincy, with office at Aurora, Ill., was elected secretary.

The main objects of the association are: (1) Co-operation in making effort to increase the quality of material and the service obtained from such material; (2) exchange of results obtained in various tests; (3) broadening the field of research work and investigation; and (4) assistance of all in working out any special or intricate problem. Several subjects were thoroughly gone into, among which were: Steel and iron wheels; steel; and paints and vehicles. Matters on which attention is desired will be taken up with the secretary, who will request all members to bring to the following meeting such data as is possible. It is understood that there will be no work undertaken which will conflict with the American Society for Testing Materials, but rather that full benefit will be received from the transactions of that society. Problems more pertinent to the railway man and requiring immediate action will be followed up as quickly as possible, and results will be made known at once to others interested. Meetings will be held as often as is found necessary. The next meeting will take place at the Hotel Stratford, September 7.

MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass.
AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Scranton, Pa.
AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.—C. M. Burt, Boston, Mass.; next meeting, St. Paul, Minn., Sept. 19, 1911.
AMERICAN ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, East St. Louis, Ill.
AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—O. G. Fetter, Carew building, Cincinnati, Ohio; 3d Friday of March and September.
AMERICAN ELECTRIC RAILWAY ASSOCIATION.—H. C. Donecker, 29 W. 39th St., New York; October 9-13, Atlantic City, N. J.
AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 75 Church St., New York; November 15, Chicago.
AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago; Oct. 17-19, 1911, St. Louis, Mo.
AMERICAN RAILWAY ENGINEERING ASSOCIATION.—E. H. Fritch, Monadnock Block, Chicago; annual convention, March 19-21, 1912, Chicago.
AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Old Colony building, Chicago.
AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—O. T. Harroun, Bloomington, Ill.
AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.
AMERICAN SOCIETY OF CIVIL ENGINEERS.—C. W. Hunt, 220 W. 57th St., New York; 1st and 3d Wed., except June and August, New York.
AMERICAN SOCIETY OF ENGINEERING CONTRACTORS.—D. J. Haner, 13 Park Row, New York; 3d Tuesday of each month, New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York.
ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—C. G. Phillips, 143 Dearborn St., Chicago; annual, June 26, 1912, Quebec, Que.
ASSOCIATION OF RAILWAY CLAIM AGENTS.—J. R. McSherry, C. & E. I., Chicago; annual convention, May 22, 1912, Los Angeles, Cal.
ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W. Ry., Chicago; annual, November 6-10, Chicago.
ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, 135 Adams St., Chicago; annual, June 24, 1912, New York.
ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 75 Church St., New York; December 12-13, Louisville, Ky.
CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 1st Tuesday in month, except June, July and Aug., Montreal.
CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLead, 413 Dorchester St., Montreal, Que.; Thursdays, Montreal.
CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 North 50th Court, Chicago; 2d Monday in month, Chicago.
CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Thurs. in Jan. and 2d Fri. in March, May, Sept., Nov., Buffalo, N. Y.
CIVIL ENGINEERS' SOCIETY OF ST. PAUL.—D. F. Jurgensen, 116 Winter St., St. Paul, Minn.; 2d Monday, except June, July and Aug., St. Paul.
ENGINEERS' SOCIETY OF PENNSYLVANIA.—E. R. Dasher, Box 704, Harrisburg, Pa.; 1st Monday after 2d Saturday, Harrisburg, Pa.
ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—E. K. Hiles, 803 Fulton building, Pittsburgh; 1st and 3d Tuesday, Pittsburgh, Pa.
FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Richmond, Va.; annual, Buffalo, N. Y.
GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—E. S. Koller, 226 W. Adams St., Chicago; Wed. preceding 3d Thurs., Chicago.
INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, rue de Louvain, 11 Brussels; 1915, Berlin.
INTERNATIONAL RAILWAY FUEL ASSOCIATION.—D. B. Sebastian, La Salle St. Station, Chicago.
INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—L. H. Bryan, D. & I. R. Ry., Two Harbors, Minn.
INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, Lima, Ohio; annual, Aug. 15, Toledo, Ohio.
IOWA RAILWAY CLUB.—W. B. Harrison, Union Station, Des Moines, Ia.; 2d Friday in month, except July and August, Des Moines.
MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York.
MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Old Colony building, Chicago.
MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION, OF UNITED STATES AND CANADA.—A. P. Dane, B. & M., Reading, Mass.; Sept. 12-15, 1911, Atlantic City, N. J.
NEW ENGLAND RAILROAD CLUB.—G. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tuesday in month, except June, July, Aug. and Sept., Boston.
NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August, New York.
NORTHERN RAILWAY CLUB.—C. L. Kennedy, C. M. & St. P., Duluth, Minn.; 4th Saturday, Duluth.
OMAHA RAILWAY CLUB.—H. H. Maulick, Barker Block, Omaha, Neb.; second Wednesday.
RAILROAD CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas City, Mo.; 3d Friday in month, Kansas City.
RAILWAY CLUB OF PITTSBURGH.—C. W. Allemann, P. & L. E., Pittsburgh, Pa.; 4th Friday in month, except June, July and August, Pittsburgh.
RAILWAY INDUSTRIAL ASSOCIATION.—G. L. Stewart, St. L. S. W. Ry., St. Louis, Mo.; annual, May 12, 1912, Kansas City, Mo.
RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Bethlehem, Pa.; annual, Oct. 10, Colorado Springs, Colo.
RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, Box C, Collinwood, Ohio.
RICHMOND RAILROAD CLUB.—F. O. Robinson, Richmond, Va.; 2d Monday, except June, July and August.
ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—Walter E. Emery, P. & P. U. Ry., Peoria, Ill.; September 12-15, St. Louis, Mo.
ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug., St. Louis.
SOCIETY OF RAILWAY FINANCIAL OFFICERS.—C. Nyquist, La Salle St. Station, Chicago; Sept. 12-14, St. Paul, Minn.
SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. Ry., Montgomery, Ala.; annual, October 20, Atlanta, Ga.
SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant bldg., Atlanta, Ga.; 3d Thurs., Jan., March, May, July, Sept., Nov., Atlanta.
TOLEDO TRANSPORTATION CLUB.—J. G. Macomber, Woolson Spice Co., Toledo, Ohio; 1st Saturday, Toledo.
TRAFFIC CLUB OF CHICAGO.—Guy S. McCabe, La Salle Hotel, Chicago; meetings monthly, Chicago.
TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 290 Broadway, New York; last Tuesday in month, except June, July and August, New York.
TRAFFIC CLUB OF PITTSBURGH.—T. J. Walters, Oliver building, Pittsburgh, Pa.; meetings monthly, Pittsburgh.
TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7042 Stewart Ave., Chicago; annual, June 18, 1912, Louisville, Ky.
TRANSPORTATION CLUB OF BUFFALO.—J. M. Sells, Buffalo; first Saturday after first Wednesday.
TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, L. S. & M. S., Detroit, Mich.; meetings monthly.
TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y.; annual, August 29-September 1, Chicago.
WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man.; 2d Monday, except June, July and August, Winnipeg.
WESTERN RAILWAY CLUB.—J. W. Taylor, Old Colony building, Chicago; 3d Tuesday of each month, except June, July and August.
WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, 1735 Monadnock Block, Chicago; 1st Wednesday in month except July and August, Chicago.
WOOD PRESERVES' ASSOCIATION.—F. J. Angier, First National Bank bldg., Chicago; annual, January 16-18, Chicago.

Traffic News.

The demands of English cotton merchants for better guarantees of the genuineness of bills of lading for cotton having been in part unsuccessful, a number of those merchants have established agencies in the southern states for the purpose of buying cotton and shipping it on their own account.

The Southern Railway has found such marked satisfaction in the service of its cotton department that four additional agents are to be employed, the purpose being to extend this work eastward into Alabama, Georgia and Florida. R. E. Grabel, one of the new agents, has his office at Macon. The duty of these cotton agents is to warn farmers how to be on the lookout against the boll weevil and how to raise cotton in spite of the pest in case it should spread to their fields.

In July, 1911, there passed through the canals at Sault Ste. Marie 2,874 vessels, of which 1,845 vessels moved through the United States canal and 1,029 through the Canadian canal. The eastbound traffic amounted to a total of 5,675,619 short tons, the principal commodity in that direction being iron ore, of which 5,161,823 short tons were hauled; in the same direction a total of 6,182,597 bushels of wheat were moved. The total westbound traffic reached 2,870,200 short tons, 2,210,309 tons of soft coal forming the principal part of the traffic in that direction. Eastbound 3,940,525 short tons passed through the Canadian canal and 1,735,094 tons through the United States canal. Westbound there passed through the United States canal 2,094,543 short tons and through the Canadian canal 775,657 tons.

The Pennsylvania Railroad has announced the discontinuance, August 31, of the tariffs which prescribe the fares to be charged on the "shuttle trains" that run between the Pennsylvania station in Manhattan, New York City and Flatbush avenue, Brooklyn; which seems to indicate that those trains are to be taken off. These trains were put on at the time of the opening of the new station in New York, to take the place of the Brooklyn ferry boats which formerly took passengers direct from Fulton street, Brooklyn, by water, to the Jersey City terminus of the Pennsylvania. Those boats connected with all of the principal trains to and from Jersey City; but the schedules of the shuttle trains are not advertised in connection with the leaving time of trains for Philadelphia and the West and it is said that they have lacked patronage because of this failure to assure passengers that in starting from Brooklyn at a given time they could be certain of the connection at the New York station.

Crop Conditions.

The government report, giving the conditions of the various crops on August 1, is as follows, stated in per cents.:

The condition of corn was 69.6.

This compares with 80.1 last month, 79.3 last year, 84.4 August 1, 1909, 82.5 August 1, 1908, and 82.8 August 1, 1907.

The condition of oats was 65.7.

This compares with 68.8 last month, 81.5 last year, 85.5 August 1, 1909, 76.8 August 1, 1908, and 75.6 August 1, 1907.

The condition of spring wheat was 59.8.

This compares with 73.8 last month, 61 last year, 91.6 August 1, 1909, 80.7 August 1, 1908, and 79.4 August 1, 1907.

The condition of barley was 66.2, against 72.1 last month, 70 last year, 85.4 August 1, 1909, and 83.1 August 1, 1908.

The yield of winter wheat per acre, preliminary report, was 14.5.

This compares with 14.6 last month, 15.8 last year, 15.5 August 1, 1909, and 15.8 the final of 1910.

The ten-year average for corn is 81.2.

The estimated winter wheat crop was 455,149,000 bushels.

This compares with 458,294,000 last year, 432,920,000 August 1, 1909, and 464,044,000 the final of 1910.

The amount of oats in farmers' hands as of August 1 was 64,342,000 bushels, against 63,249,000 last year, 26,323,000 August 1, 1909; 38,090,000 August 1, 1908, and 68,000,000 August 1, 1907.

The average quality of winter wheat was 92.0.

This compares with 92.6 August 1, 1910, 90.3 August 1, 1909, 90.1 August 1, 1908, and 90.5 August 1, 1907.

The yield of corn per acre was 22.6 bushels.

This compares with 25.5 last month, 25.4 last year, 27.1 August, 1909, and 27.4 the final of 1910.

The yield of rye per acre is given at 15.6.

The estimated yield of spring wheat per acre was 10.1 bushels. This compares with 11.8 last month, 10.1 last year, 14.7 August, 1909, and 11.7 the final of 1910.

The indicated yield of oats per acre was 23.2 bushels.

This compares with 23.2 last month, 28.5 last year, and 31.9 the final of 1910.

The indicated corn crop was 2,621,000,000 bushels.

This compares with 2,956,455,000 last month, 2,897,708,000 last year, 2,954,063,000 August, 1909, and 3,125,713,000 the final of 1910.

The indicated spring wheat crop was 209,646,000 bushels.

This compares with 244,933,000 bushels last month, 199,394,000 last year, 270,348,000 August, 1909, and 233,399,000 the final of 1910.

The estimated oats crop was 817,800,000 bushels.

This compares with 817,800,000 last month, 979,830,000 last year and 1,126,765,000 the final of 1910.

Indicated yield per acre of winter and spring wheat combined was 12.8 bushels.

The indicated total wheat crop, spring and winter, was 664,795,000 bushels.

This compares with 702,891,000 last month, 657,688,000 last year, 703,268,000 August, 1909, and 695,443,000 the final of 1910.

Indicated barley crop was 140,056,000 bushels.

Indicated rye crop, 31,216,000 bushels.

Indicated yield of barley per acre, 19.8 bushels.

The condition of hay was 68.6, against a ten-year average of 87.1.

Eggs of Alligators?

The local freight traffic officers of the Southern Pacific had to buckle down and solve a problem that was as hazy as some of the reputed answers of the Oracle at Delphi, when William E. Voekel & Sons announced that they had twenty-one crates of live alligators, two boxes of alligator eggs and one box of Louisiana bullfrogs to ship to the California alligator farm at Los Angeles, Cal.

The problem arose when a careful searching of the tariff sheet revealed the fact that there was no specific rate on either reptiles, saurians or batrachians. The shipment was charged the rate of live animals not otherwise specified.

The rate on tigers and lions, elephants and hippopotami, not to mention bears and wolves, is \$3 per 100 lbs., so the alligators had to pay \$9 per 100 lbs., or walk and swim the distance to the 'gator farm. The frogs had to content themselves with the same classing.

The alligator eggs were easy in the billing, but whether they will reach their destination in the same category is doubtful. The eggs went in the classification covering the general egg family, but, as the question presented itself in the Southern Pacific freight office, should they hatch en route that classification could not apply.

Should this contingency arise it might be a cause celebre for the Interstate Commerce Commission to figure out.—(New Orleans) *Daily Picayune*.

The Beam in the Shipper's Eye.

It is noteworthy that very few shippers appeared before the commission in person. This has aroused the suspicion of a fear that while claiming the railroads are reaping undue returns they might have been cross-examined as to the amount of their own profits. In these days of great industrial and commercial corporations the line of distinction between public or quasi-public and private enterprise would seem to be different from that of the long past generations when industry and commerce were conducted by the individual artisan and the individual merchant for whose benefit highways had to be provided and of necessity at the public expense. That the people should be fed and clothed and provided with shelter is certainly a public necessity. Now that these necessities are largely provided by great corporations it is not an exaggeration to say that they are performing a public service, that their functions are of a public nature, and therefore that they should be regulated if the railroads are to be regulated.

REVENUES AND EXPENSES OF RAILWAYS.

MONTH OF JUNE, 1911. (SEE ALSO ISSUE OF AUGUST 4.)

Name of road.	Operating revenues			Maintenance of way and structures			Operating expenses			Net operating revenue			Outside operations, net.			Operating income (or loss), net.			Increase (or decrease) from year to year.		
	Mileage operated at end of period.	Freight.	Passenger.	Total inc. misc.	Total inc. misc.	Traffic.	Trans- portation.	General.	Total.	Total inc. misc.	Traffic.	Trans- portation.	General.	Total.	Taxes.	Total.	Total inc. misc.	Traffic.	Trans- portation.	General.	
Alabama & Vicksburg.....	142	2,050,038	52,449	227,046	29,400	4,496	49,241	\$42,824	\$4,043	16,917	1,127	1,138	\$4,685	\$12,370	-\$25,049	-\$25,049	12,370	-\$25,049	-\$25,049		
Arizona Eastern.....	103,038	4,333,392	1,144,938	34,345	18,859	1,144,467	13,237	40,179	75,194	69,762	102	4,174	203,116	65,690	-\$6,045	65,690	65,690	-\$6,045	65,690		
Atlanta, Topeka & Santa Fe.....	4,354 ^a	4,373,789	1,946,861	51,455	1,117,642	20,059	20,706	186,886	4,420,409	2,517,046	102	203,116	2,517,046	2,517,046	2,517,046	2,517,046	2,517,046	2,517,046	2,517,046		
Atlantic Coast Line.....	4,498	1,556,244	558,135	43,055	9,227,223	2,332,123	364,393	1,678,860	1,678,827	1,678,860	102	171,247	482,280	482,280	482,280	482,280	482,280	482,280			
Baltimore & Ohio.....	4,434 ^a	5,720,123	1,289,891	7,461,732	1,057,732	1,310,971	156,362	5,199,979	157,742	5,199,979	102	210,752	2,261,730	2,261,730	2,261,730	2,261,730	2,261,730	2,261,730			
Baltimore & Ohio Chicago Terminal.....	627 ^a	2,050,038	52,449	227,046	29,400	4,496	49,241	72,024	11,123	146,606	102	20,117	110,323	110,323	110,323	110,323	110,323	110,323			
Bangor & Aroostook.....	340	101,425	26,782	36,080	126,954	21,380	2,819	56,669	371,665	33,183	102	18,864	61,456	61,456	61,456	61,456	61,456	61,456			
Charleston & Western Carolina.....	1,495	3,121,332	25,858,29	1,037,937	1,629,522	47,106	55,876	7,034	1,156	246,448	102	17,866	228,942	228,942	228,942	228,942	228,942	228,942			
Chicago, Indiana & Southern.....	329	263,843	211,369	1,029,522	1,029,522	7,334	105,886	8,357	224,762	67,760	102	13,900	53,371	53,371	53,371	53,371	53,371	53,371			
Chicago, Milwaukee & St. Paul.....	7,511	3,371,884	288,650	51,822,262	51,822,262	40,254	53,398	35,899	104,741	66,436	102	20,307	560,871	560,871	560,871	560,871	560,871	560,871			
Chicago, Rock Island & Pacific.....	470	198,292	48,886	262,027	262,027	22,363	102,559	120,267	8,787	141,479	102	9,744	110,973	110,973	110,973	110,973	110,973	110,973			
Cleveland, Cincinnati, Chicago & St. Louis.....	7,550 ^a	3,121,332	1,629,557	5,878,372	5,878,372	707,900	69,179	154,156	1,891,056	1,40,243	102	2,933,298	9,331	9,331	9,331	9,331	9,331	9,331			
Colorado & Southern & Puget Sound.....	1,978	1,521,824	703,712	2,449,289	2,449,289	211,163	410,509	59,102	967,451	62,555	102	1,070,480	678,899	678,899	678,899	678,899	678,899	678,899			
Delaware, Lackawanna & Western.....	1,196 ^a	431,034	322,482	5,210,003	5,210,003	474,426	302,273	322,656	51,605	51,872	102	21,128	1,216,191	1,216,191	1,216,191	1,216,191	1,216,191	1,216,191			
Denver & Rio Grande.....	2,566	1,373,089	444,867	1,897,633	1,897,633	1,92,153	1,42,244	16,729	26,785	2,744	102	2,237	2,698	2,698	2,698	2,698	2,698	2,698			
Detroit & Mackinac.....	360	60,652	52,410	34,539	34,539	26,215	20,276	16,777	2,135	2,135	102	1,857	8,100	8,100	8,100	8,100	8,100	8,100			
Detroit, Toledo & Ironton.....	441	92,243	114,430	295,698	295,698	63,412	35,794	9,066	100,735	57,033	102	17,944	1,422	1,422	1,422	1,422	1,422	1,422			
Duluth, South Shore & Atlantic.....	601	185,266	93,745	295,698	295,698	51,348	79,519	12,420	153,112	24,229	102	22,319	18,579	18,579	18,579	18,579	18,579	18,579			
El Paso & Southwestern Co.....	901	446,556	87,305	406,620	406,620	82,146	82,270	53,800	15,993	18,855	102	18,135	61,590	61,590	61,590	61,590	61,590	61,590			
Florida East Coast.....	583	160,241	160,241	258,150	258,150	89,057	100,895	93,923	31,173	302,899	102	6,143	217,267	217,267	217,267	217,267	217,267	217,267			
Gulf, Colorado & Santa Fe.....	1,537 ^a	309,962	286,681	275,417	275,417	154,221	153,049	79,897	18,730	18,730	102	1,357	1,357	1,357	1,357	1,357	1,357	1,357			
Houston East & West Texas.....	190	56,316	31,107	93,636	93,636	14,619	8,702	1,875	20,768	3,687	102	3,046	3,320	3,320	3,320	3,320	3,320	3,320			
Indiana Harbor Belt.....	108	217,253	45,993	205,642	205,642	22,399	22,877	19,655	5,256	27,270	102	4,455	26,195	26,195	26,195	26,195	26,195	26,195			
Iowa Central.....	558	108,112	121,055	132,754	132,754	15,196	16,146	10,644	11,404	11,404	102	2,032	5,157	5,157	5,157	5,157	5,157	5,157			
Kanawha & Michigan.....	175	240,519	286,681	275,417	275,417	52,108	44,014	11,108	11,108	11,108	102	5,157	15,592	15,592	15,592	15,592	15,592	15,592			
Lake Shore & Michigan Southern.....	1,662	2,458,332	1,003,768	3,951,967	3,951,967	721,228	588,221	46,734	1,256,017	84,612	102	2,696,812	1,255,15	1,255,15	1,255,15	1,255,15	1,255,15	1,255,15			
Louisiana & Arkansas.....	350	221,055	24,777	19,001	98,318	18,217	2,701	2,701	2,701	2,701	102	4,455	5,157	5,157	5,157	5,157	5,157	5,157			
Louisiana Railroad & Navigation Co.....	207	500,400	278,107	834,666	834,666	122,319	106,521	61,613	280,131	2,698	102	2,215	1,216,191	1,216,191	1,216,191	1,216,191	1,216,191	1,216,191			
Maine Central.....	931	500,400	278,107	834,666	834,666	122,319	106,521	61,613	280,131	2,698	102	2,215	1,216,191	1,216,191	1,216,191	1,216,191	1,216,191	1,216,191			
Michigan Central & St. Louis.....	1,804 ^a	1,475,293	665,194	2,394,785	2,394,785	241,976	318,425	23,663	923,844	47,013	102	1,554,921	839,864	839,864	839,864	839,864	839,864	839,864			
Missouri, Kansas & Texas of Texas.....	1,027	249,740	115,121	392,888	392,888	103,781	100,592	63,930	23,444	34,440	102	37,473	12,796	12,796	12,796	12,796	12,796	12,796			
Mobile & Ohio.....	1,114	334,149	310,065	703,781	703,781	102,088	102,088	31,444	31,444	31,444	102	32,052	61,832	61,832	61,832	61,832	61,832	61,832			
Morgan's Louis. & Tex. R. R. & S. S. Co.....	404 ^a	220,544	99,139	339,153	339,153	83,276	35,259	13,349	14,211	14,211	102	2,797	287,901	287,901	287,901	287,901	287,901	287,901			
New Orleans & Northeastern.....	195	188,931	49,542	285,786	285,786	51,048	50,048	9,936	1,321,420	8,434	102	1,216,191	59,635	59,635	59,635	59,635	59,635	59,635			
New York Central & St. Louis River.....	359 ^a	4,911,952	2,891,135	1,322,451	1,322,451	89,236	1,35,920	1,35,920	1,35,920	1,35,920	102	2,215	2,215,15	2,215,15	2,215,15	2,215,15	2,215,15	2,215,15			
New York, Ontario & Western.....	545	63,027	132,571	1,322,451	1,322,451	15,235	15,235	15,235	15,235	15,235	102	2,215	2,215,15	2,215,15	2,215,15	2,215,15	2,215,15	2,215,15			
Oregon Short Line.....	1,646 ^a	1,099,783	425,740	342,594	342,594	20,901	20,901	57,613	67,593	67,593	102	1,079,253	64,977	64,977	64,977	64,977	64,977	64,977			
Oregon Shortline R. R. & Nav. Co.....	1,856	849,345	461,955	1,399,204	1,399,204	119,619	116,494	51,177	49,205	49,205	102	52,723	7,304	7,304	7,304	7,304	7,304	7,304			
Petone & Eastern.....	351	166,939	55,478	242,211	242,211	49,136	42,325	4,877	103,914	6,320	102	2,215	35,639	35,639	35,639	35,639	35,639	35,639			
Pittsburgh & Lake Erie.....	215,187	1,19,934	122,284	1,322,451	1,322,451	15,235	15,235	15,235	15,235	15,235	102	2,215	2,215,15	2,215,15	2,215,15	2,215,15	2,215,15	2,215,15			
Pittsburgh, Cincinnati, Chicago & St. Louis.....	1,467	2,054,123	696,303	3,100,200	3,100,200	122,283	122,283	8,012	20,808	20,808	102	2,215	2,215,15	2,215,15	2,215,15	2,215,15	2,215,15	2,215,15			
St. Louis, San Francisco & Texas.....	243	58,511	102,772	48,347	88,397	98,097	5,944	2,921	2,921	2,921	102	2,215	1,216,191	1,216,191	1,216,191	1,216,191	1,216,191	1,216,191			
St. Louis, Southwestern & Mexico.....	796 ^a																				

RAILWAY AGE GAZETTE.

REVENUES AND EXPENSES OF RAILWAYS.

YEAR ENDED JUNE 30, 1911.

Name of road.	Operating expenses						Net operating revenue (or deficit).	Outside operations, net.	Operating income (or loss).	Taxes.	Operating income (or loss) with last year.
	Mileage operated at end of period.	Freight.	Passenger inc. misc.	Maintenance of way and structures.	Traffic.	Transportation.					
Alabama & Vicksburg.	1,113,206	496,797	1,666,938	248,229	308,009	44,995	602,429	64,585	1,268,250	56,152	-59,746
Arizona Eastern.	1,162,709	400,932	89,164,216	363,903	150,382	465,272	50,436	1,053,158	70,416	53,484	-244,577
Atchison, Topeka & Santa Fe.	1,154	1,162,709	22,74,764	12,847,208	13,869,044	1,851,546	1,966,323	56,637,493	61,377,027	2,52,727	2,024,714
Atlantic Coast Line.	7,549	59,034,125	31,622,449	3,926,658	4,538,890	10,556,334	843,164	60,447,539	11,174,909	2,02,527	-92,488
Baltimore & Ohio.	4,493	67,623,937	15,208,432	88,145,003	10,129,516	15,881,620	1,948,966	32,818,300	25,378,936	-148,312	22,634,374
Baltimore & Ohio Chicago Terminal.	627	2,372,128	31,808	1,451,102	202,271	221,002	9,066	962,665	1,226,657	10,471	-1,175
Bangor & Aroostook.	1,340	1,492,525	326,845	1,373,111	313,360	368,689	37,104	1,29,061	2,003,771	45,841	1,123,439
Barataria & New Orleans.	3,309,923	2,844,470	12,618,641	1,337,160	1,877,148	50,66,920	419,020	9,290,942	643,238	60,090	583,168
Charleston & Western.	329	3,820,370	279,435	1,366,755	741,008	101,518	50,56,920	105,825	1,287,379	1,287,379	184,966
Chicago, Indiana & Southern.	2,020	1,603,958	1,603,958	1,503,344	964,932	2,642,226	27,965,953	1,118,709	8,290,129	6,226,238	-60,829
Chicago, Milwaukee & Puget Sound.	7,511	44,776,454	14,077,747	64,975,995	429,940	865,401	1,064,449	1,09,946	4,703,719	1,915,195	1,71,446
Chicago, Milwaukee & St. Paul.	7,470	2,083,788	688,422	9,422,933	65,082,407	9,254,896	9,066,335	1,890,936	24,974,244	1,664,841	1,062,446
Chicago, Rock Island & Pacific.	7,551	19,422,936	3,871,695	19,422,936	65,082,407	9,254,896	5,292,012	970,818	12,983,568	6,849,101	2,36,907
Chicago, Rock Island & St. Louis.	1,978	19,972,595	2,933,816	3,871,695	1,761,883	1,761,883	1,761,883	1,761,883	1,761,883	1,761,883	-2,27,889
Cleveland & Southern.	1,196	26,067,975	1,557,584	14,516,367	998,038	1,045,908	1,119,189	587,083	8,039,384	5,98,033	88,459
Colorado & Southern.	1,930	23,391,821	7,605,521	34,974,501	2,627,895	4,119,189	1,632,491	342,161	37,356	741,631	1,659,664
Delaware, Lackawanna & Western.	2,556	12,241,918	512,438	23,391,821	1,244,734	1,044,238	1,54,667	26,605	383,415	32,948	111,331,080
Denver & Rio Grande & Pacific.	214	671,904	311,734	1,177,05	1,177,05	1,177,05	1,17,533	700,427	354,700	354,700	252,744
Detroit & Mackinaw.	360	788,151	4,074,747	1,761,495	440,104	241,341	32,302	959,891	1,743,813	41,652	-141,346
Detroit, Toledo & Ironton.	441	2,012,584	519,503	3,148,818	512,176	1,755,465	1,195,816	82,821	2,69,341	89,084	292,245
Detroit, South Shore & Atlantic.	611	5,859,310	7,978,485	890,182	579,329	1,30,982	1,13,524	2,80,289	7,27,600	855,621	6,546,813
Duluth, South Shore & Atlantic.	901	1,465,024	2,183,384	1,465,024	1,465,024	1,465,024	1,465,024	1,465,024	1,465,024	1,465,024	-88,459
El Paso & Southwestern.	583	10,984,587	10,984,587	1,429,063	1,632,491	1,632,491	1,632,491	1,632,491	1,632,491	1,632,491	-24,204
Houston East & West Texas.	1,90	885,935	2,510,048	2,888,936	1,30,982	1,30,982	1,30,982	1,30,982	1,30,982	1,30,982	-80,546
Houston, Harrisburg & San Antonio.	1,338	7,536,023	1,244,734	311,734	1,044,238	1,044,238	1,044,238	1,044,238	1,044,238	1,044,238	-87,080
Galveston, Galveston, Harrisburg & San Antonio.	307	4,395,055	13,442,933	3,111,051	9,666,276	3,78,294	494,370	1,006,937	18,036,937	8,205,219	124,886
Georgia Northern & Western.	1,537	8,145,877	13,069,340	12,087,866	2,13,493	1,738,642	2,13,493	2,13,493	2,13,493	2,13,493	-100,806
Gulf, Colorado & Southern.	789	25,457,970	1,675,445	1,317,892	219,049	1,19,813	21,316	2,61,362	2,61,362	2,61,362	-103,155
Houston East & West Texas.	190	885,935	2,510,048	2,888,936	1,30,982	1,30,982	1,30,982	1,30,982	1,30,982	1,30,982	-442,630
Iowa Central Railroad.	175	2,688,646	354,137	500,388	500,388	500,388	500,388	500,388	500,388	500,388	-3,563,413
Kanawha & Michigan.	886	4,221,142	896,513	4,245,125	7,928,622	1,144,322	1,144,322	1,144,322	1,144,322	1,144,322	32,809
Lake Erie & Western.	1,662	31,435,620	11,255,679	48,452,125	3,148,818	1,761,495	1,761,495	1,761,495	1,761,495	1,761,495	-13,183
Lake Shore & Michigan.	255	1,182,60	1,432,638	232,384	1,88,289	188,289	60,856	69,165	72,493	2,42,274	-72,897
Louisiana & Arkansas & Navigation Co.	350	1,310,704	244,820	1,699,604	255,807	298,280	288,280	288,280	288,280	288,280	-64,724
Louisiana, Western & Navigation Co.	207	1,333,888	672,748	2,105,740	335,021	1,910,734	1,910,734	1,910,734	1,910,734	1,910,734	-368,511
Louisville, Western & St. Louis.	199	730,685	401,773	1,214,692	309,824	1,416,938	1,416,938	1,416,938	1,416,938	1,416,938	-1,416,938
Maine Central.	931	5,530,769	2,960,662	9,067,803	9,067,803	9,067,803	9,067,803	9,067,803	9,067,803	9,067,803	-37,009
Michigan Central.	1,804	19,234,550	7,449,869	29,766,826	4,042,549	848,955	12,504,549	1,25,000	52,022,224	53,754	-146,956
Minnesota Central.	1,348	6,255,989	1,722,348	5,094,016	479,867	1,25,000	1,25,000	1,25,000	1,25,000	1,25,000	-54,025
Missouri, Kansas & Texas.	1,646	1,376,374	4,87,724	1,88,288	1,88,288	1,88,288	1,88,288	1,88,288	1,88,288	1,88,288	-1,42,851
New York, Ontario & Western.	1,856	1,515,292	1,432,292	11,197,346	1,285,758	1,285,758	1,285,758	1,285,758	1,285,758	1,285,758	-1,42,851
Oregon Short Line.	296	2,535,942	714,299	3,508,587	501,646	590,394	70,426	1,498,252	55,921	75,667	-1,42,851
Oregon-Washington, R. R. & Nav. Co.	404	2,127,900	323,299	1,625,186	228,522	309,179	1,271,387	1,271,387	1,271,387	1,271,387	-1,42,851
Pearl & Northern Texas.	295	1,227,900	1,555,446	1,570,620	1,354,936	1,354,936	1,354,936	1,354,936	1,354,936	1,354,936	-1,42,851
Pittsburgh & Lake Erie.	215	13,670,998	1,555,446	1,570,620	1,354,936	1,354,936	1,354,936	1,354,936	1,354,936	1,354,936	-1,42,851
Pittsburgh, Cincinnati, Chicago & St. Louis.	1,467	26,481,033	8,124,224	455,800	1,70,431	243,113	15,706	507	246,800	4,663	-1,42,851
St. Joseph & Grand Island.	319	11,108,288	455,800	1,70,431	243,113	15,706	507	246,800	4,663	507	-1,42,851
St. Louis, Brownsville & Mexico.	243	7,165,198	255,324	1,907,360	1,907,360	1,907,360	1,907,360	1,907,360	1,907,360	1,907,360	-1,42,851
St. Louis, Southwestern & New Orleans.	797	5,947,516	4,87,724	1,88,288	1,88,288	1,88,288	1,88,288	1,88,288	1,88,288	1,88,288	-1,42,851
Texas & Pacific.	364	1,49,844	1,431,699	1,460,489	167,125	320,089	1,271,387	1,271,387	1,271,387	1,271,387	-1,42,851
Vandalia.	444	4,143,861	639,751	1,005,832	1,005,832	1,005,832	1,005,832	1,005,832	1,005,832	1,005,832	-1,42,851
Western, Kansas of Texas.	125	56	832,171	1,195,315	1,195,315	1,195,315	1,195,315	1,195,315	1,195,315	1,195,315	-1,42,851
Sunset.	80	1,027,070	1,163,999	1,163,999	1,163,999	1,163,999	1,163,999	1,163,999	1,163,999	1,163,999	-1,42,851
Tennessee Central.	293	1,042,837	389,358	1,068,713	1,068,713	1,068,713	1,068,713	1,068,713	1,068,713	1,068,713	-1,42,851
St. Louis, Brownsville & New Orleans.	451	1,263,329	1,068,713	1,068,713	1,068,713	1,068,713	1,068,713	1,068,713	1,068,713	1,068,713	-1,42,851
St. Louis, Southwestern & New Orleans.	1,884	1,068,988	1,149,844	1,149,844	1,149,844	1,149,844	1,149,844	1,149,844	1,149,844	1,149,844	-1,42,851
St. Louis, Western & St. Louis.	364	1,149,844	1,149,844	1,149,844	1,149,844	1,149,844	1,149,844	1,149,844	1,149,844	1,149,844	-1,42,851
Toledo & Ohio Central.	452	1,503,182	11,073,761	51,22,441	1,422,441	1,422,441	1,422,441	1,422,441	1,422,441	1,422,441	-1,42,851
Trinity & Brazos Valley.	342	3,578,307	1,240,270	1,240,270	1,240,270	1,240,270	1,240,270	1,240,270	1,240,270	1,240,270	-1,42,851
Union Pacific.	9	1,242,317	1,242,317	1,242,317	1,242,317	1,242,317	1,242,317	1,242,317	1,242,317	1,242,317	-1,42,851
Union (of Balto.)	31	31	31	31	31	31	31	31	31	31	-1,42,851
Union (of Penna.)	444	4,143,861	639,751								

If the rates of the one are to be limited, why not the prices of the other? If the rates of the one are to be limited, in order that profits may be but moderate, why should not the prices of the other be limited in order that their profits may likewise be moderate? If the era of paternalism in which we have taken a long step is to endure there should not be distinction between Peter and Paul.—*L. E. Johnson*, before the Southern Shoe Wholesalers' Association.

INTERSTATE COMMERCE COMMISSION.

The commission has decided to make a general investigation of allowances made to short line railways serving iron industries, particularly in Ohio.

The commission has announced that, beginning at Oklahoma City, September 11, a general investigation will be made into freight rates on live stock and fresh meat from the Southwest to Chicago. Over 150 roads have been notified to appear. Hearings will be held in other places.

The commission has suspended until November 25 the new tariff supplement of the San Pedro, Los Angeles & Salt Lake, in which about 500 other companies participate, which prescribes the rules under which fruit will be taken for pre-cooling. Among other things the new tariff provides that when shippers instruct that commodities loaded in cars, tanks of which contain ice, are not pre-iced in transit, the full refrigeration charges published shall apply. The privilege heretofore which the shippers had of pre-icing carload shipments of citrus fruits is withdrawn, and the railways exercise the exclusive right of furnishing and billing all icing and refrigeration of citrus fruits in all cases where the shipper does not specifically direct that the shipment shall move under ventilation solely.

The Commission has suspended until December 30 proposed advances in class freight rates between the Mississippi and Missouri rivers, which were to have become effective on October 28, 1911. The suspension affects also the proportions of through rates from the Atlantic Seaboard. The increases proposed average about 9 cents per 100 lbs. (first class). The rates in question are substantially the same as those complained of in the Burnham-Hanna-Munger case in 1908. The commission issued an order in that proceeding reducing the rates on first-class freight from 60 to 51 cents, and making proportionate reductions on freight of other classes. The roads contested the order, which was effective for two years from November 10, 1908. In October, 1910, the United States Supreme Court sustained the commission's order and the lower rates were made effective immediately. They continued in effect only fourteen days, when, on the expiration of the two years' life of the order, the roads again advanced them. The advances were suspended and the case will be heard probably early in the approaching autumn.

STATE COMMISSIONS.

The Nebraska state railway commission has issued a call to the commissioners of 13 other states to attend a conference to be held in Lincoln, August 28, when methods of obtaining physical valuation of railway properties will be discussed.

The Oklahoma Corporation Commission has issued, tentatively, a tariff fixing freight rates on brick, stone and other building materials and will hold a hearing August 12. This action of the commission is taken to establish rates in place of those recently enjoined and set aside by the Federal court.

COURT NEWS.

In the Federal court at Portland, Ore., July 31, Judge Wolverton declared that section 27 of the new Oregon railway law was invalid as containing unconstitutional requirements affecting interstate traffic. This section requires adequate interchange facilities and has a clause to regulate charges for switching.

A Michigan court has granted a temporary injunction against the enforcement of the law of that state limiting passenger rates in the Upper Peninsula to 2 cents a mile. The application was made by the Duluth, South Shore & Atlantic. The law was to have gone into effect August 2. Argument for a permanent injunction will be heard September 26, and until then the present rate of 3 cents a mile will continue in force.

Railway Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

R. S. Marshall has been appointed assistant to the vice-president and general manager of the Minneapolis & St. Louis and the Iowa Central, with office at Minneapolis, Minn.

A. H. Mansfield has been appointed assistant general claim agent of the Missouri Pacific, with headquarters at St. Louis, Mo., to succeed C. Hoeppner, who has been appointed assistant attorney, with office at St. Louis.

W. W. Cumberworth, chief clerk in the auditing department of the Lake Erie & Western at Indianapolis, Ind., has been appointed auditor of freight accounts, with headquarters at Indianapolis, to succeed A. W. Wilmington, resigned.

Operating Officers.

A. A. Gist has been appointed trainmaster of the Atchison, Topeka & Santa Fe, with headquarters at Arkansas City, Kan.

H. H. Ober, trainmaster of the Chicago, Milwaukee & St. Paul at Wausau, Wis., has been appointed superintendent of the Wisconsin Valley division, with headquarters at Wausau.

H. C. Owen has been appointed trainmaster of the Northern Railway Company (Costa Rica), with office at Limon, Costa Rica, succeeding A. Curotte, resigned to go to another company.

J. B. Austin, Jr., engineer maintenance of way of the Long Island Railroad, at Jamaica, N. Y., has been appointed superintendent, with office at Long Island City, succeeding F. Hartenstein, resigned.

F. R. Bolles has been appointed assistant general manager of the Copper Range, with headquarters at Houghton, Mich. A. E. Ehlers, trainmaster at Houghton, has been appointed assistant superintendent, and G. T. Hartman, assistant trainmaster, has been appointed assistant superintendent, both with headquarters at Houghton.

N. J. Groves, assistant superintendent of the Missouri & North Arkansas at Leslie, Ark., has been appointed superintendent, in charge of transportation, with headquarters at Leslie. The positions of assistant superintendent at Searcy, Ark., in charge of maintenance, and assistant superintendent at Leslie in charge of transportation, have been abolished.

J. M. Chandler, car accountant of the St. Louis, San Francisco & Texas and the Fort Worth & Rio Grande at Fort Worth, Tex., has been appointed trainmaster, with office at Fort Worth, succeeding F. B. Parker, resigned to engage in other business. G. A. Chandler, chief clerk in the office of the vice-president, succeeds J. M. Chandler as car accountant.

F. E. Williamson, assistant superintendent of the Mohawk division of the New York Central & Hudson River, at Albany, N. Y., has been appointed acting superintendent of the St. Lawrence division, with office at Watertown, succeeding to the duties of Cornelius Christie, granted leave of absence on account of ill health. D. B. Fleming, assistant superintendent at New York, has been appointed acting assistant superintendent of the Mohawk division, with office at Albany, succeeding Mr. Williamson. T. W. Crowley, trainmaster at Dover Plains, N. Y., has been appointed acting assistant superintendent, at New York, succeeding Mr. Fleming. O. O'Connor, train dispatcher on the Harlem division, has been appointed acting trainmaster, succeeding Mr. Crowley.

George W. Berry, superintendent of the Wisconsin division of the Illinois Central at Freeport, Ill., has been appointed terminal superintendent, with office at Chicago, with jurisdiction between South Water street and Matteson and between Twelfth street and Parkway. The jurisdiction of the superintendent of freight terminals and that of the superintendent of passenger terminals at Chicago has been extended to cover the same territory and they will report to the terminal superintendent. John F. Dignan, trainmaster at Freeport, succeeds Mr. Berry. Abner Bernard has been appointed trainmaster, with jurisdiction over passenger and freight service between Sixty-third street, Chicago,

and Matteson; and Fred Ehertsman has been appointed trainmaster at Chicago, with jurisdiction over passenger and freight service between South Water street and Sixty-third street and between Twelfth street and Parkway, including the St. Charles Air Line. W. E. Briggs, special agent on the St. Louis division, has been transferred to the Wisconsin division. George McCowan succeeds Mr. Briggs.

Traffic Officers.

F. A. Pontius has been chosen assistant manager of the Chicago Demurrage Bureau.

H. S. Humphreys has been appointed a commercial agent of the Rock Island Lines, with office at Enid, Okla.

D. E. Gilbert has been appointed contracting freight agent of the Wabash Railroad, with office at Pittsburg, Pa.

H. A. Noble has been appointed general passenger agent of the Great Northern, with headquarters at St. Paul, Minn., succeeding S. J. Ellison, resigned.

C. H. Jenson has been appointed traveling freight agent of the Chicago Great Western, with headquarters at Red Wing, Minn., succeeding A. D. Beals, resigned.

W. E. Davidson has been appointed general agent of the St. Louis, Iron Mountain & Southern, with office at Monroe, La., to succeed R. T. Varner, resigned.

L. P. Harris, chief clerk in the advertising department of the S. Louis & San Francisco, has been appointed city passenger agent, with office at Cincinnati, O., in place of E. Z. Giblon, resigned.

E. B. Rock, Jr., traveling freight agent of the Seaboard Air Line, at Cordele, Ga., has been transferred to Atlanta, succeeding P. S. Burney, Jr., resigned. C. E. Felton succeeds Mr. Rock, with office at Cordele.

O. C. Stein has been appointed contracting freight agent of the Illinois Central, with office at New Orleans, La., succeeding J. M. Cousins, resigned to become commercial agent of the Missouri & North Arkansas.

Edward J. Platt has been appointed traveling freight agent of the St. Louis & San Francisco, with headquarters at San Antonio, Tex., succeeding J. T. Brooks. T. J. Bryan has been appointed soliciting freight agent at San Antonio.

G. L. Edwards has been appointed a commercial agent of the Missouri & North Arkansas, and A. L. Dewey has been appointed a traveling freight agent, both with offices at Memphis, Tenn. The traffic office at Memphis is a new one.

F. R. Bolles, general freight and passenger agent of the Copper Range, has been appointed traffic manager, with office at Houghton, Mich., and C. W. Marquardt, contracting agent at Houghton, has been appointed assistant general freight and passenger agent, with headquarters at Houghton. George Williams, division freight and passenger agent, with office at Calumet, Mich., has been appointed general agent, with headquarters at Calumet.

George B. Haynes, whose appointment as assistant general passenger agent of the Chicago, Milwaukee & St. Paul, was announced in the *Railway Age Gazette* of July 21, was born at Ainsworth, Iowa, on August 22, 1871. He graduated from the Omaha (Neb.) high school in 1890, and entered railway service in March, 1891, with the Union Pacific. On December 28, 1892, he went to the Chicago, Milwaukee & St. Paul, as clerk in the office of the general western agent at Omaha, Neb., and was promoted to passenger agent at Omaha June 1, 1893, and made city passenger agent in 1897. He was appointed traveling passenger agent, with headquarters at Chicago, June 1, 1903, which position he held until October 1, 1907, when he was made immigration agent, which office he filled until his recent appointment on July 15 as assistant general passenger agent, with office at Chicago.

Engineering and Rolling Stock Officers.

J. C. Carlton has been appointed roadmaster of the Northern division of the Northern Railway Company (Costa Rica), with office at Zent, Costa Rica, succeeding E. Landreau, resigned.

F. G. Colwell has been appointed master mechanic of the Buffalo division of the Delaware, Lackawanna & Western, with office at East Buffalo, N. Y., succeeding B. H. Hawkins, resigned.

D. W. Cross has been appointed acting master mechanic of the Toledo, St. Louis & Western, with headquarters at Frankfort, Ind., to succeed M. Marea, resigned to accept service with another company.

The title of W. B. Redgrave, division engineer of the Staten Island Rapid Transit Railway and the Staten Island Railway Co., at St. George, Staten Island, N. Y., has been changed to engineer of maintenance of way.

J. L. McDonald, general foreman of bridges and buildings of the Missouri, Kansas & Texas at Denison, Tex., has been appointed superintendent of bridges and buildings of the Texas Lines, succeeding F. W. Baily, resigned.

H. E. Hale, principal assistant engineer of the Missouri Pacific, with headquarters at St. Louis, Mo., has been appointed engineer of maintenance of way of the Southern district, with office at Little Rock, Ark., succeeding E. J. Correll, resigned.

E. M. Weaver, signal engineer of the Long Island Railroad, at Jamaica, N. Y., has been appointed engineer maintenance of way, succeeding J. B. Austin, Jr., who has been transferred to the operating department. The office of signal engineer has been abolished.

F. J. Allen, resident engineer of the Missouri & North Arkansas at Eureka Springs, Ark., has been appointed engineer of maintenance of way, in charge of tracks, bridges, buildings, right of way and water service, with headquarters at Eureka Springs, and his former position has been abolished.

H. Marsh, for seven years general car foreman of the Baltimore & Ohio Southwestern at Washington, Ind., has been appointed general car foreman of the Iowa Central, with headquarters at Marshalltown, Ia., succeeding W. E. Looney, resigned. W. W. Calder succeeds Mr. Marsh, with office at Washington.

F. C. Moeller has been appointed night roundhouse foreman of the Rock Island Lines at Silvis, Ill., in place of J. Fitzgerald, who has been appointed machine foreman at the Forty-seventh street shops, Chicago, succeeding George Stone, promoted. W. O. Morton has been appointed night roundhouse foreman at Burr Oak, Ill., succeeding William Glenn, promoted.

W. O. Thompson, master car builder of the New York Central & Hudson River, at East Buffalo, N. Y., has had his authority extended and is now in charge of the territory west of Syracuse, including the St. Lawrence, Ontario and Pennsylvania divisions, and G. E. Carson, master car builder, at West Albany, has had his authority extended and is now in charge of the territory east of Syracuse, including the Hudson, Harlem and Putnam divisions.

P. H. Reeves, motive power inspector of the Baltimore & Ohio Southwestern at Cincinnati, Ohio, has been appointed master mechanic, with office at Chillicothe, Ohio, succeeding George F. Hess, resigned to become superintendent of machinery of the Kansas City Southern. N. S. Brooks has been appointed general foreman of the Baltimore & Ohio Southwestern, with headquarters at Storrs, Cincinnati, succeeding W. F. Hayes, resigned on account of ill health.

W. V. Betts, supervisor of Division No. 1 of the Philadelphia, Baltimore & Washington, at Clayton, Del., has been appointed supervisor of Subdivision No. 15, Buffalo & Allegheny Valley division of the Pennsylvania Railroad, with office at Reynoldsburg, Pa., succeeding M. C. Phalen, assigned to other duties. H. D. Stowe succeeds Mr. Betts. W. E. Dunbar, assistant supervisor of the Northern Central, at York, Pa., has been appointed assistant supervisor of Division No. 3, of the Philadelphia division of the Pennsylvania Railroad, with office at Lancaster, succeeding Porter Allen, promoted, and C. M. Hursh, assistant supervisor of the Northern Central, at South Port, N. Y., has been appointed assistant supervisor of Division No. 22, of the Tyrone division, with office at Osceola Mills, succeeding R. P. Koons, promoted. H. M. Grimm has been appointed assistant supervisor of the Northern Central, at York, Pa., succeeding Mr.

Dunbar, and C. W. Barwis has been appointed assistant supervisor at South Port, N. Y., succeeding Mr. Hursh.

George F. Hess, whose appointment as superintendent of machinery of the Kansas City Southern and Arkansas Western was announced in our issue of last week, was born at Ft. Wayne, Ind., January 1, 1872, and was educated in the public schools. He entered railway service in March, 1886, as office boy in the master mechanic's office of the Pennsylvania Company at Ft. Wayne. After serving as machinist apprentice from March, 1887, to March, 1891, he worked as machinist for various roads until July, 1897, when he was made roundhouse foreman of the Wabash at Montpelier, Ind., being transferred to Delray, Mich., in a similar position, in May, 1898, where he remained a year. He was subsequently general foreman of the Grand Trunk at Detroit, Mich., and in March, 1901, went to the Chicago, Rock Island & Pacific as roundhouse foreman at Pratt, Kan. In July, 1901, he was transferred to Caldwell, Kan., as roundhouse foreman, and one year later was made machine shop foreman at Chicago. He was appointed general foreman of the Baltimore & Ohio at South Chicago, Ill., in April, 1903, and was promoted to master mechanic at Lorain, Ohio, in June of that year, being transferred to Chillicothe, Ohio, as master mechanic in November, 1910. He held the latter position until his appointment as above mentioned. The headquarters of Mr. Hess will be at Pittsburg, Kan., instead of Kansas City, Mo., as stated in our issue of August 4.

Purchasing Officers.

D. B. Allan has been appointed assistant general storekeeper, in charge of the Omaha store, of the Union Pacific, with headquarters at Omaha, Neb. Mr. Allan's title has been assistant to general storekeeper.

OBITUARY.

John C. Cornell, formerly engaged on the construction of the Colorado & Wyoming, now part of the Chicago, Burlington & Quincy, died at his home in Denver, Colo., on August 4, at the age of 69 years.

Frank B. Williams, who was the first telegrapher employed by the Associated Press when that organization began operating its system of leased wires in 1886, died Tuesday night at his home in Louisville, Ky., after an illness of eight months. In Pittsburgh he handled the first message over the leased wire. Since 1886 he served the Associated Press at New Orleans and Louisville, latterly there as chief operator.

J. H. Conlen, during 1903 vice-president, chief engineer and general superintendent of the Chicago, Rock Island & Mexico, now part of the Rock Island System, was found dead in a room in the Roberts Banner building at El Paso, Tex., on August 4. He had been shot and the despatches indicate that he had been killed by his own hand. Mr. Conlen was superintendent of the Rock Island terminal elevation work in Chicago during 1908.

Nathaniel M. Osborne, resident assistant to the president of the Norfolk & Western, at Norfolk, Va., died at his home in Norfolk on July 31. Mr. Osborne was born February 6, 1842, at Petersburg. He began railway work on January 1, 1868, and has been in the service of the Norfolk & Western or its constituent companies ever since. In May, 1881 he was appointed secretary to the general manager of the Norfolk & Western. Subsequently he was made superintendent of the Eastern division, and later was general agent at Norfolk.

Edward J. Swords, general eastern agent of the Chicago, Burlington & Quincy, with office in New York, died at his home in that city August 3. Mr. Swords was born in New York in 1842, and during the civil war he served as an engineer in the volunteer service of the United States army. He began railway work in July, 1870. He was appointed agent of the Chicago, Burlington & Quincy at New York, in October, 1876, and was later general western agent of the same road at Denver, Colo. From July, 1883 to September, 1887 he was general freight agent of the Kansas City, St. Joseph & Cotneil Bluffs, and from May, 1884 to September, 1887 was also general freight agent of the Hannibal & St. Joseph, both Burlington properties. He had been general eastern agent since September, 1887.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

THE REID NEWFOUNDLAND is building 8 locomotives at the company's shops at St. John's.

THE CZARNIKOW-RIONDA, New York, has ordered two switching locomotives from the American Locomotive Company. The dimensions of the cylinders will be 8 in. x 14 in.; diameter of the driving wheel will be 26 in. and the total weight in working order will be 25,000 lbs.

THE AMERICAN RAILWAYS OF PORTO RICO have ordered four compound consolidation locomotives from the American Locomotive Company. The dimensions of the cylinders will be 14 in. and 20 in. x 20 in.; diameter of the driving wheel will be 37 in. and the total weight in working order will be 82,000 lbs.

CAR BUILDING.

THE REID NEWFOUNDLAND is building 50 box cars, 3 sleeping cars, 3 coaches and 1 dining car at the company's shops at St. John's.

THE ATLANTIC COAST LINE has ordered 900 box and 100 flat cars from the Standard Steel Car Company. This road is now in the market for 17 baggage and 18 postal cars.

SWIFT & CO., Chicago, mentioned in the *Railway Age Gazette* of July 21 as being in the market for tank cars has ordered 50 such cars from the Pressed Steel Car Company.

THE MISSOURI PACIFIC, mentioned in the *Railway Age Gazette* of July 7 as being in the market for 50 passenger cars, has ordered 15 baggage cars and 14 mail cars from the American Car & Foundry Company; and 11 chair cars, 8 coaches and 2 combination cars from the Pullman Company.

IRON AND STEEL.

THE CENTRAL RAILWAY OF HAVANA has ordered 4,500 tons of rails from the Maryland Steel Co.

THE SOUTHERN PACIFIC has ordered 200 tons of structural material for its new station at Oakland, Cal.

THE NEW ORLEANS & MOBILE has ordered 5,500 tons of rails from the Tennessee Coal Iron & Railroad Company.

THE SOUTHERN RAILWAY has ordered 21,000 tons of open-hearth rails from the Tennessee Coal, Iron & Railroad Company.

THE PORTLAND RAILWAY, LIGHT & POWER CO., Portland, Ore., has ordered 600 tons of structural material for towers from Millikin Bros., Inc.

THE COPPER RIVER & NORTHWESTERN has ordered 104 tons of structural material for tank construction at Katella, Alaska, from the Llewellyn Iron Works.

GENERAL CONDITIONS IN STEEL.—The Steel Corporation has increased its operations to 77 per cent. of its capacity, but a slight falling off is looked for within a week. The monthly report of the corporation for July is expected to show an increase in both unfilled tonnage and in net earnings over June.

It is expected that by direction of the ministry of finance at Vienna, Austria, the provincial government will lay before the Diet in the autumn session a bill providing for a loan of some \$20,000,000. The money will probably be used for various purposes—educational grants, provision for public works, including a diet house, a general post office, and law courts at Sarajevo, new barracks, etc., and perhaps \$5,070,000 for railways. The lines to be then taken in hand will probably be those from Banjaluka to Jajce, the northermost section of the proposed Banjaluka-Klek railway; from Brcka to Tuzla, part of the proposed Brcka-Sarajevo line; and from Novi to Bihać, all in the north of the Province.

Supply Trade News.

The Isthmian Canal Commission will receive bids until September 6 on miscellaneous supplies, including track bolts and screw spikes.

The American Steel Tie Company, Salt Lake City, Utah, has been incorporated with \$1,000,000 capital stock to make steel ties with rail fixtures for use without bolts or spikes of any kind. Joseph R. Murdock is president, John T. Clark, vice president, and J. W. Musser, secretary and treasurer.

The Western Electric Company, Chicago, has recently put on the market for use in railway work a new dry battery. This new cell differs from the standard cell in that the cardboard carton has been treated with a special impregnating compound which prevents moisture from reaching the cell proper. This will give sufficient protection so that the life of the batteries used in outdoor work will be as great as that of the batteries used in any other magneto service under ordinary conditions.

Hildreth & Company, New York, and the Morgan T. Jones Company, Chicago, inspecting and supervising engineers, have formed a combination under the title of the Hildreth-Jones Company. Morgan T. Jones will be in full charge of the western district, with headquarters in Chicago. Mr. Hildreth has been in business as a consulting and inspecting engineer in New York since 1888. Morgan T. Jones was for upwards of ten years connected with R. W. Hunt & Company, Chicago, and later for nearly seven years was president of the American Bureau of Inspection & Tests, Chicago.

J. W. Motherwell, assistant to the vice-president of the Ashton Valve Company, Boston, Mass., has been made vice-president of that company and manager of the railway department. Mr. Motherwell was born in Lancaster, Ohio. After completing a public school course he entered as machinist and tool maker apprentice the Motherwell Iron & Steel Works, Lancaster, which was owned by his father and uncles. There he became foreman of the shops. Later he was connected with Fairbanks, Morse & Company for 12 years as a mechanical expert and railway representative. He left that firm seven years ago and since that time has been assistant to the late Vice-President Fred A. Casey, of the Ashton Company, whose recent death was mentioned in these columns. Mr. Motherwell did splendid work as chairman of the executive committee of the Railway Supply Men for the International Railway General Foremen's convention which met at the Hotel Sherman, Chicago, last month.

The General Electric Company, Schenectady, N. Y., has received an order from the Delaware & Hudson for one 7500 k. w. turbine, one 100 k. w. turbo-exciters and four 2500 kva. transformers. This apparatus will give an increased power supply to the company's electric traction interests in Albany, N. Y., Troy and Schenectady, and will also furnish power for the company's new shops at Watervliet. This company has also delivered one of the six gas-electric motor cars recently ordered by the Frisco Lines, to Brownsville, Tex., where it will be run between Brownsville and Mission. A second gas-electric car of this order is being sent to the Orange & Northwestern division of the Frisco Lines. The other four, as soon as completed, will be operated on different parts of the system where such service is desirable.

An Illinois Central box car equipped with the Williams all-service car door made by the Williams All-Service Car Door Company, Clinton, Ill., was unloaded at the Keith elevator, Twenty-second and Halsted streets, Chicago, on Wednesday, August 2, in the presence of a number of railway and elevator representatives. Within 50 seconds of the time the car was stopped the wheat was pouring into the boot. The size of the opening in the door, however, was so large that the sink was soon overflowed and it was necessary to hold the doors partly shut to allow the hoisting apparatus to carry away the grain. It was about 10 minutes from the time the doors were open until the steam shovels were thrown in to push the unloading, but during that time the elevating machinery was working at full capacity to care for the grain delivered by gravity. The car had carried 51 tons of wheat for a long haul and had undergone considerable switching before it reached the elevator, but the doors were found to be in excellent condition.

Edwin M. Herr, whose selection to the presidency of the Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has been mentioned in these columns, was born in Lancaster, Pa., May 3, 1860. In

1873 he moved to Denver, Colo. Upon completion of a common school course, he was given the position of telegraph operator on the Kansas Pacific, with which company he remained for two years. He was promoted from construction train service to the position of station agent. In 1881 he entered the Sheffield scientific school of Yale and graduated with the class of 1884. During this time he spent his two summer vacations working as an apprentice in the shops of the Pennsylvania at Altoona, Pa. From 1884 to 1885 he was apprentice at the West Milwaukee shops of the Chicago, Milwaukee & St. Paul. He then went to the Chicago, Burlington & Quincy as a draftsman in the mechanical engineer's office, and afterwards became assistant engineer of tests, and then engineer of tests at Aurora, Ill. From 1887 to 1889 he was superintendent of telegraphy, and from 1889 to 1890 was division superintendent of this road. From 1890 to 1892 he was division master mechanic of the Chicago, Milwaukee & St. Paul at West Milwaukee, Wis. From 1892 to 1894 he was superintendent of the Grant Locomotive Works, Chicago. From 1895 to 1896 he was superintendent of motive power and machinery of the Chicago & North Western, and from 1896 to 1898, held the same position with the Northern Pacific. On September 10, 1898, he became assistant general manager of the Westinghouse Air Brake Company, Pittsburgh, Pa., with office at Wilmerding, Pa. He was promoted to the position of general manager on November 1, 1899, which position he held until June 1, 1905, when he was elected first vice-president of the Westinghouse Electric & Manufacturing Company.

The Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has received an order from the St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., for a partial equipment of 307 interpole railway motors. The Denver & Inter-Mountain Railway Company has placed an order with this company for quadruple equipments of 306-B interpole railway motors with type K-35 control. The Hutchinson Interurban Railway Company of Kansas has ordered a double equipment of 92-A railway motors with type K 10-A control. The Birmingham Railway Light & Power Company has ordered a 1000 k. w. 60-cycle, self-starting rotary converter with the usual accompaniment of transformers, switchboards, glorifiers, etc. The Capitol Traction Company, Washington, D. C., has placed with the



J. W. Motherwell.



E. M. Herr.

Westinghouse company an order for two complete sub-station equipments—one covering a 1500 k. w., 25-cycle, self-starting, rotary converter with the necessary transformers and switchboards; and the other, a 1000 k. w., 25-cycle, self-starting, rotary converter with switchboards and transformers. The Chicago Railways Company has placed an order with this company for equipment for the extension of its La Salle street sub-station, including two 3000 k. w., 25-cycle, self-starting, rotary converters, with the necessary transformers, and a 10-panel switchboard. The Georgia Railway & Electric Company, Atlanta, Ga., has placed an order for a 1000 k. w., 60-cycle, self-starting, rotary converter with transformers and switching apparatus. The Interurban Railway Company, Des Moines, Ia., has placed an order for a 300 k. w., railway rotary converter. The Metropolitan Street Railway, Kansas City, Mo., has ordered a 3000 k. w., 25-cycle, self-starting, rotary converter with three 11,000 kva. air blast transformers and the necessary switching and glower apparatus.

TRADE PUBLICATIONS.

NORTHERN PACIFIC.—This company has issued a small booklet called *What Minnesota Wants to Tell You*. The many industries, resources and attractions of this state are described in such a way as to tempt a prospective home seeker.

DENVER & RIO GRANDE.—The passenger department of the Denver & Rio Grande has issued a pamphlet entitled *Panoramic Views* showing nine Rocky Mountain views in colors with descriptions of some of the most prominent places.

TOOLS.—The Pratt & Whitney Co., Hartford, Conn., has published catalog No. 6 of its small tools, including taps, dies, die stock sets, milling cutters, reamers, punches, twist drills, lathe tools, etc. The catalog contains about 250 pages, is well illustrated, and includes many tables and considerable useful data.

LOCOMOTIVES.—The Vulcan Iron Works, Wilkes-Barre, Pa., has recently published a well-illustrated, 144-page, catalog of its locomotives of from 7 to 70 tons weight on drivers. This company, besides building for light road service aims to meet the varying needs of the contractor and of mining, steel and industrial plants. Illustrations are given of their different types with an accompanying table which gives the capacities of different sizes of that type. Suggestions are given as to the ordering of locomotives and the drawing up of their specifications. The last 36 pages contain valuable information in the shape of formulae and tables.

VALVE GEAR.—The Baldwin Locomotive Works, Philadelphia, Pa., recently issued record No. 70, describing the application and the method of setting Walscheart valve gear. Two illustrations show the arrangement of the gear for both outside and inside admission valves, and eight illustrations show its applications to different types of locomotives. The method of setting valves with this gear is described in detail. Both the outside and the inside admission piston valves and the outside admission slide valves are considered, with notes on the travel irregularities and the corrections to be made when the valve gear is found to be out of square. Under corrections, two hypothetical cases are considered for both the inside and outside admission valves. The discussion on valve setting is supplemented by many line drawings which make the subject matter clear. A few paragraphs at the end of the pamphlet are devoted to the handling of the Walscheart gear in the event of a break-down.

At a meeting of the Korean Railway Association held in Seoul, Mr. Oya, chief engineering expert in Korea, gave some important particulars as to the construction of railways in the peninsula. He said that the new line between Seoul and Gensan would be open to traffic from 1914, and the road from Mokpo to Tajon would be opened one year sooner, namely, 1913. The system of five lines—from Seoul to Gensan, from Mokpo to Tajon, from Seoul to Fusan, from Seoul to Wiju, and from Seoul to Chemulpo—would measure in all 985 miles. Finally the bridge across the Yalu would be open to traffic in the spring of next year. Mr. Oya alluded to the fact that this system of railways had not been planned with primary reference to local needs. He practically admitted that such was the case, and that the intention of the program had been rather to meet the demands of the world's traffic. He was convinced that events would establish the wisdom of this selection.

RAILWAY AGE GAZETTE.

Railway Construction.

New Incorporations, Surveys, Etc.

ALGOMA CENTRAL & HUDSON BAY.—A contract has been given to the Superior Construction Co., Ltd., Espanola, Ont., for building from Hobon, on the Canadian Pacific, to a point on the National Transcontinental, about 101 miles. Sub-contractors desiring to secure sections of this work should communicate immediately with the contractors at Espanola. (July 28, p. 198).

ATLANTIC COAST LINE.—According to press reports, this company will build an extension from Monticello, Fla., to Perry, 30 miles.

BALLARD & THOMPSON.—An officer writes that contracts are to be let at once to build from Thompson Springs, Utah, to Ballard. The line is to be built to carry coal. B. F. Bauer, Salt Lake City, may be addressed. (See *Utah Roads*, July 28, p. 199).

BALTIMORE & OHIO.—An officer writes that surveys have been made for improvements from Portsmouth, Ohio to Hamden, on the Southwestern division, but it has not been definitely decided what improvements are to be made.

BATESVILLE SOUTHWESTERN.—An officer writes that work is now under way by J. B. Lewis, Batesville, Miss., building from Batesville, on the Illinois Central, southwest. Track has been laid on about three miles. There will be one steel bridge. The line is being built to carry lumber, merchandise and farm products. C. H. Markham, president, and M. H. Baldwin, chief engineer, Chicago. R. J. Darnell, lessee, Memphis, Tenn.

BELLINGHAM, MT. BAKER & SPOKANE INTERURBAN.—An officer writes that the prospects of building this line are good. The company was organized in the state of Washington to build from Bellingham, Wash., southeast via Deming to Glacier, thence to the headwaters of the north fork of the Nooksack river. The line is eventually to be extended along the Skagit river and Slate creek to near Barron and down the Methow valley and river to Twisp, thence east via Silver, Methow and Pateros. The line will carry coal, cement and lime rock, timber and wheat. Joseph Morrison, president, and C. E. Wright, chief engineer, Bellingham.

BUFFALO, ROCHESTER & PITTSBURGH.—See report of this company elsewhere in this issue.

CANADIAN PACIFIC.—An officer writes that contracts have been let to Palmer Brothers & Henning, Vancouver, B. C., to build the Cowichan Lake branch of the Esquimalt & Nanaimo, from Duncans, to Cowichan lake, 18 miles. The work will all be light earth work. Maximum grades will be 1.5 per cent. and maximum curvature 10 degrees. The line is being built to carry lumber. (July 21, p. 157).

An officer writes that a contract has been let to W. P. Tierney, Nelson, B. C., to build a spur from Three Forks to Lucky Jim Mine.

Location plans have been approved by the board of railway commissioners of Canada for a branch from Hamiota, Man., northwest to Birtle, 32.67 miles. A branch is to be built from Boissevain, Man., northwest to Lauder, about 40 miles, and location work is now under way for a branch from the present end of track, north of Virden northwest to McAuley, about 30 miles.

Track laying is under way from Imperial, Sask., southerly and it is expected to have the work finished to Craven, about 60 miles, early in September.

Grading work is now under way on a branch from Bassano, Alb. to the company's irrigation lands.

CHEAT HAVEN & BREWSTER.—Incorporated with \$75,000 capital to build from Cheat Haven, Pa., southeast to Albright, Preston county, W. Va., about 25 miles. The headquarters of the company are at Lee Ferry, W. Va.

CHICAGO, MILWAUKEE & PUGET SOUND.—A contract is said to have been given to the Bates & Rogers Co., at about \$250,000, for building a double-track line at Spokane, Wash.

CHICAGO, WEATHERFORD & BRAZOS VALLEY.—Financial arrangements have been made, it is said, for the completion of this line, now under construction from Weatherford, Tex., north to

Bridgeport, 30 miles. Rails have been bought and it is announced that as soon as the line is finished to Bridgeport work will be started on an extension from Weatherford, southwest to Lipan, 25 miles. F. B. Truax, chief engineer, Weatherford. (February 3, p. 257.)

DENVER, NORTHWESTERN & PACIFIC.—According to press reports, work is to be resumed at once on the extension from Steamboat Springs, Colo., west towards Salt Lake City, Utah.

EASTERN MAINE.—This company has been incorporated in Maine for the purpose of utilizing the charter granted by the last Maine legislature for a standard gage steam or electric line, from tidewater at Brewer, Me., to Houlton, about 95 miles. The capital stock is \$500,000. The route from Brewer is easterly about 12 miles, thence northeasterly towards Bancroft, thence north to Houlton. The line will open up timber lands. George W. Maxfield, president; F. O. Beal, treasurer, both of Bangor, and H. M. Heath, clerk, Augusta. The directors include: William H. Taylor, New York; H. P. Sargent, South Brewer, Me., and A. G. Chambers, Haynesville. (April 14, p. 907.)

EL PASO & SOUTHWESTERN.—The contract for building an extension of this road from Fairbanks, Ariz., to Tucson, 67 miles, has been let to the MacArthur Brothers Company, New York, and it is understood that construction work will be started as soon as the necessary equipment can be placed on the ground. The cost of the work will be about \$3,000,000. (July 21, p. 158.)

ESQUIMALT & NANAIMO.—See Canadian Pacific.

GRAND TRUNK PACIFIC.—Train service on the Prairie division is now in operation from Edson, Alb., west to Hinton, 55.6 miles, and the Mountain division has been opened for business from Prince Rupert, B. C., northeast to Vanarsdol, 100.9 miles.

IDAHO NORTHERN RAILWAY.—An officer writes that work is now under way by the Utah Construction Co., Ogden, Utah, on an extension from Emmett, Idaho, north along the Payette river to Smiths Ferry, 56.2 miles. The work is difficult and expensive. There will be four steel bridges and two important trestles. The line is being built to carry lumber, grain, hay, sheep and cattle. (June 2, p. 1296.)

ILLINOIS CENTRAL.—An officer writes that the new work to be carried out near McComb, Miss., consists of grade reduction on 3.31 miles of double-track, for which contracts have been let. This work involves handling 79,000 cu. yds. of earth. (Apr. 21, p. 970.)

MISSOURI, OKLAHOMA & GULF.—An officer writes that a general contract has been let to the Hoffman Construction Co. to build an extension from a point near Henryetta, Okla., west probably via Okemah and Shawnee to Oklahoma City, about 102 miles. It is expected to begin the work, which will be heavy, in about two months. Maximum grades will be 0.6 per cent., and maximum curvature 4 degrees. Two locating parties are now working west from Henryetta and expect to finish the work by October 1. (June 23, p. 1674.)

NEW YORK SUBWAYS.—The New York Public Service Commission, First district, has awarded the contract to the Oscar Deniels Company for work on contract No. 12 of the new subway, at a bid of \$2,825,740, which was the lowest bid for this section. The contract covers the section from 106th street, Manhattan, under Lexington avenue to 118th street. Two stations are included, one at 110th street and one at 116th street. The award will be sent to the City Board of Estimate for approval. Work will be commenced at once on this section, also on the four sections already let to the Bradley Construction Company, the one section let to the Peckworth Company, and one to the Metropolitan Contracting Company, of Boston. (July 7, p. 65.)

OMAHA & WESTERN IOWA TRACTION.—An officer writes that the reconnaissance surveys for a 100-mile line have been made, the route being from Omaha, Neb., via Council Bluffs, Iowa, Crescent, Honey Creek and up the east side of the Missouri valley to Sioux City. It is estimated that the total cost of construction and equipment will be \$3,000,000, including terminals. Preliminary work is now in progress, but no track has been laid as yet. The road will carry passengers, express and freight. Frank W. Bacon, president and treasurer; E. T. Hathaway, vice-president; Daniel G. Cary, secretary, and K. B. Ward, chief engineer, all with offices at Omaha, Neb. (November 4, p. 887.)

PENNSYLVANIA RAILROAD.—The Pennsylvania, Monongahela & Southern has built an extension from a point north of the former Rice's Landing (Pa.) passenger station, to a point south of the new station, 0.33 miles, and this extension is now operated as a part of the Monongahela division.

PENNSYLVANIA ROADS (Electric).—Plans are being made by H. C. Allen of the Buffalo & Lake Erie Traction Co., it is said, to build an electric line from Erie, Pa., southeast to Corry, thence southwest to Cambridge Springs, 42 miles.

L. M. Smith, Pittsburgh, Pa., is said to be back of a project to build an electric line from Erie, Pa., via Corry, Cambridge Springs, Townville and the Sugar Creek valley to Franklin.

RICHMOND & NORTHERN NECK.—An officer writes that preliminary surveys are expected to be finished during August for a line from Doswell, Va., easterly via Tappahannock, thence south-easterly crossing the Rappahannock river to a point on Chesapeake bay at or near Wicomico, about 70 miles. C. M. Ward, chief engineer, Tappahannock.

ROCK ISLAND, TEXICO, FARWELL & SOUTHERN.—See Texas, New Mexico & Pacific.

SALT RIVER VALLEY (Electric).—Incorporated in Arizona to build lines as follows: From Phoenix, Ariz. to Peoria, 15 miles; to Mesa, 18 miles; to Scottsdale, 11 miles. The estimated cost of the work is \$600,000. F. M. Winter, J. K. Leck and W. S. Furman, are incorporators.

SAN JOAQUIN VALLEY ELECTRIC.—An officer writes that work is now under way from Stockton, Cal., via French Camp, Manteca, Ripon and Salida to Modesto. A contract for some of the work has already been let. There is to be a 200 ft. reinforced concrete bridge, and a 1,500 ft. trestle. N. H. Colwell, Stockton, is the supervising engineer. (November 18, p. 986.)

SPRINGFIELD & NORTHWESTERN INTERURBAN.—This company recently completed its organization and has surveys made to build from Springfield, Ill., northwest to Petersburg, about 20 miles. Some of the right-of-way has been secured. The directors include: H. J. Tice, Greenview; R. Y. Kincaid, Athens; E. D. Keys, R. N. Baker, W. F. Workman, F. Reisch, Jr., and S. E. Prather, Springfield.

TEXAS, NEW MEXICO & PACIFIC.—Incorporation will be asked for in Texas or New Mexico by this company, as successor to the Rock Island, Texico, Farwell & Southern. The company wants to hear from contractors and construction companies, to build from Tucumcari, N. Mex., southeast to Farwell, Tex., then south to Knowles, N. Mex., thence southeast via Midland, Tex., to Kerrville. Grading has been finished on 33 miles. The work will be light, maximum grades will not be over 1 per cent. The line is being built to carry coal and general products. M. J. Healy, president, Amarillo, Tex. (See Rock Island, Farwell & Gulf, June 30, p. 1714.)

TIDEWATER & SOUTHERN (Electric).—This company, in addition to building a line from Stockton, Cal., south to Turlock, will build an extension, it is said, to Fresno. J. H. Wallace, president, Stockton. (May 5, p. 1085.)

TOMBIGBEE VALLEY.—This road has been extended from Silas, Ala., to Souwilpa, four miles.

UNION PACIFIC.—A new branch has been opened for business on the Colorado division, from Dent, Colo., northwest to Fort Collins, 68 miles.

VERA CRUZ, TABASCO & CAMPECHE.—Financial arrangements have been made with English capitalists for building this line from Santa Lucrecia, Mex., on the Vera Cruz & Isthmus, east to Campeche, on the United Railways of Yucatan, 470 miles. Grading work has been started at Santa Lucrecia and it is expected that when the rainy season is over work will be commenced also from Campeche. The entire route through the states of Oaxaca, Chiapas, Tabasco and Campeche will traverse a rich section of Mexico at present without railway facilities. Connection is to be made at the western end with the National Railways of Mexico. A concession to build this line was granted to Prim Wood, Mexico City, in May, 1910. David Coe, chief engineer, Mexico City. (April 7, p. 878.)

WESTERN & ATLANTIC.—A proposition looking toward the extension of this road to tidewater was included in a report made

recently by the executive committee appointed to investigate that property. The plan suggested was to move the Chattanooga and Atlanta terminals of the road, rent the valuable land they now occupy and use the money thus realized to extend the road to the Atlantic coast. The road is now in operation from Chattanooga, Tenn., to Atlanta, Ga., 137 miles.

WICHITA FALLS & NORTHWESTERN.—See Wichita Falls Route.

WICHITA FALLS ROUTE.—According to press reports, a contract has been given to W. H. Dennison, Lubbock, Tex., for work on a nine-mile section of the extension of the Wichita Falls & Northwestern, from Hammon, Okla., north towards Woodward. This work is north of the South Canadian river. A contract was recently let for work from Hammon to the river, and a third contract has been let to J. L. McSpadden, for some of the work between the river and Woodward. (July 28, p. 199.)

YOSEMITE VALLEY RAILROAD.—An officer writes that this company now has under construction spurs and sidings at Merced Falls, Cal., a Y at El Portal, and a passing track will be built during the fall at Pleasant Valley. These improvements are made necessary principally to handle the expected business from the Yosemite Lumber Co. An officer of the latter company writes that a grading contract has been given to L. J. Scoffey, San Francisco, for work on a logging line. The route is up an incline to the top of the mountain on the south side of the Merced river at an altitude of 3,100 ft., the length of the slope being about 8,000 ft. and maximum grade 80 per cent. From this point there will be a four-mile logging line built this year, to which extensions will be made as may be necessary for logging purposes. 40,000-lb. capacity standard gage flat cars, when loaded, will be lowered down the incline, one at a time, on a 1½-in. cable, while an empty car is being raised, and at the foot of the incline they will be delivered to the Yosemite Valley Railroad, and carried 54 miles over that road to Merced Falls, at which place the lumber company is now building a new saw-mill to have a capacity of 150,000 ft. The work will be difficult owing to the steep grade of the incline, part of which will be through solid rock. Maximum grades on the logging road will be 4 per cent. compensated and 12 per cent. on spurs not compensated. G. H. Nickerson, chief engineer, El Portal.

RAILWAY STRUCTURES.

BARSTOW, CAL.—Plans are being made by the Atchison, Topeka & Santa Fe Coast Lines, it is said, for building a 44-stall concrete roundhouse at Barstow. The estimated cost of the work is \$75,000.

BELLINGHAM, WASH.—Plans have been approved by the board of public works for new freight sheds for the Northern Pacific at Bellingham.

BLOOMINGTON, IND.—According to press reports, a contract has been given by the Chicago, Indianapolis & Louisville to the Chicago Construction Co., at \$22,000, for putting up a new passenger station at Bloomington. A new freight house to cost \$7,000 is to be built by the company's men.

BRANDON, MAN.—A contract has been given to the Brandon Construction Co. for putting up a new station for the Canadian Pacific at Brandon, the work is to be finished by February, 1912.

CHICKASHA, OKLA.—A contract has been given to the Lisle-Dumind Construction Co., Oklahoma City, it is said, to build a steel and concrete station for the Oklahoma Central in Chickasha. The building will cost about \$30,000. The foundation work is already under way.

CORDOVA, ALASKA.—Plans have been made by the Copper River & Northwestern for a new station at Cordova.

DULUTH, MINN.—According to press reports, contracts have been given by the Canadian Northern to John A. Johnson and Hugh Fawcett, Duluth, for putting up the 10-stall roundhouse and shop buildings at Duluth. Plans are now being made for a new passenger station at Virginia, which is to be a stone structure, two stories high, to cost between \$20,000 and \$25,000. (July 21, p. 159.)

EMMETT, IDAHO.—See Idaho Northern Railway under Railway Construction.

FORT SMITH, ARK.—According to press reports, the Kansas City Southern has given a contract to T. T. Reddick, Fort Smith, for putting up the passenger station at Fort Smith, at his bid of \$95,877. (August 4, p. 269.)

GRESHAM, ORE.—The Mount Hood Railway & Power Co. will build new car shops at Gresham, it is said, for which plans have been completed.

JAMAICA, N. Y.—The New York Public Service Commission, First district, has granted the petition of the Long Island Railroad for a change in the location of the new station which is to be built on a site 1,790 ft. west of the present location. This is part of the general Jamaica improvement work being carried out by the Long Island Railroad, including shortening the main line and the elimination of curves and grade crossings. (Dec. 23, p. 1194.)

JOLIET, ILL.—The contract for building a union passenger station at Washington and Scott streets, Joliet, to cost about \$250,000 has been let to Adam Groth & Co. of that city. The new station will be used by the Chicago, Rock Island & Pacific, The Atchison, Topeka & Santa Fe, the Chicago & Alton, and the Michigan Central. The grade separation work and the building of subways, described in the *Railway Age Gazette* of March 16, 1910, page 627, has been practically completed.

KANSAS CITY, Mo.—The Kansas City Terminal Co. has awarded the contract, amounting to between \$4,000,000 and \$5,000,000, for building the Kansas City Union Station, to the George A. Fuller Construction Co., Chicago.

LOS ANGELES, CAL.—Plans are being made for putting up a 10-story office and terminal building at 12th and Main streets in Los Angeles, for the Los Angeles Railway and connected interests. Myron Hunt is the architect, Los Angeles.

MONCTON, N. B.—Work is now under way building an extension to the general office building of the Intercolonial Railway at Moncton. The Rhodes-Curry Co., Amherst, are the contractors. The improvements will cost about \$100,000.

MUMFORD, N. Y.—The Buffalo, Rochester & Pittsburgh has given a contract to the Hyde-Murphy Co., Ridgway, Pa., for putting up a combined freight and passenger station at Mumford. A contract has been given to the same contractors for building a passenger station at Orchard Park. The buildings are to be of brick and stone construction, with tiled roofing.

NEW CASTLE JUNCTION, PA.—The Baltimore & Ohio is putting up a building at New Castle Junction which is to be used as the headquarters of the division forces. Upon completion of the work the offices at New Castle will be located at New Castle Junction.

OELWEIN, IA.—The Chicago, Great Western improvements at Oelwein, amounting to \$100,000, mentioned in the *Railway Age Gazette* of July 28, will consist of a modern brick passenger station, a transfer table 72 ft. long, a power house, a 170,000-gallon steel tank, an oilhouse, a blacksmith shop and a new coaling station.

ORCHARD PARK, N. Y.—See Mumford, N. Y. (July 21, p. 159).

STOCKTON, CAL.—See San Joaquin Valley under Railway Construction.

THE DALLES, ORE.—The Great Southern station at The Dalles has been destroyed by fire.

TUCSON, ARIZ.—The Southern Pacific is making plans, it is said, to put up new shops at Tucson.

VIRGINIA, MINN.—See Duluth, Minn.

WEST TORONTO, ONT.—A contract for the construction of the concrete abutments for the Canadian Pacific subway at Jane street, West Toronto, has been let, it is said, to Wells & Gray, Ltd., Toronto.

WILMINGTON, N. C.—The Seaboard Air Line has awarded the contract for building a warehouse 90 ft. x 421 ft. with necessary docks, fire walls, etc., to cost about \$40,000 and dredging 90,000 cubic yards adjacent to the building amounting to about \$30,000.

Railway Financial News.

ALGOMA EASTERN.—The Bank of Montreal recently offered in London £513,600 (\$2,568,000) 5 per cent. first mortgage bonds of 1911-1961, guaranteed principal and interest by the Lake Superior Corporation. The company now has in operation 22 miles of railway, and it is planned to build in all 86 miles from Sudbury, Ont., to Little Current. This company was known heretofore as the Manitoulin & North Shore.

ATCHISON, TOPEKA & SANTA FE.—Stockholders are to be asked at the next annual meeting, October 26, 1911, to approve an issue of \$100,289,000 convertible bonds. The bonds may be issued by the directors from time to time under such terms and conditions as they deem expedient.

In a letter to stockholders accompanying the notice of meeting President Ripley says:

"It seems desirable to take steps at this time to provide for an additional increase of \$100,000,000 in the authorized common capital stock of the company and to provide for the issue of convertible bonds for that amount or any part thereof and also for \$289,000 of common stock already authorized but not used or reserved for other purposes.

"Ample provision of this character seems wise, although at this date it is not anticipated that there will be immediate resort to this method of financing."

Among matters to come before this meeting is a proposal to purchase from the Southern Pacific 242 miles of line between The Needles, Cal., and Mojave, which the Atchison has long operated under lease from the owner. This line is a part of the Atchison's through main line to the coast. The purchase price is not stated in the notice to stockholders, but will probably lie between \$5,000,000 and \$10,000,000. The company asks the authority of the stockholders to issue general mortgage bonds for this purpose, under a clause of the mortgage which still authorizes the further issuance of about \$6,700,000 bonds.

Stockholders will be asked to approve and confirm the leases to the Atchison of the Kings River Railway, the Laton & Western, and the Garden City, Gulf & Northern, and the purchase of the capital stock and bonds of the last named road.

BOONVILLE, ST. LOUIS & SOUTHERN.—Spitzer, Rorick & Co., Toledo, Ohio, are offering \$500,000 first mortgage 5 per cent. bonds of 1911-1951 at 101 3/4, yielding 4.90 per cent. on the investment. These bonds are guaranteed principal and interest by the Missouri Pacific. They are a first closed mortgage at the rate of about \$11,000 per mile. This property was recently bought by the Missouri Pacific.

BOSTON ELEVATED.—The directors of the West End Street Railway have voted to accept the terms on which the Massachusetts legislature has authorized the consolidation of this company with the Boston Elevated. Favorable action is required of the Boston Elevated also to make the legislation effective, but it is understood that acceptance by this company is assured. The Boston Transit Commission, after the filing of the necessary plans, is to make an agreement with the Boston Elevated for the exclusive use of new tunnels, and contracts for the following new tunnels are to be let:

From Park street station in Boston via South Boston to Dorchester.

From Commonwealth avenue and Beacon street under Boylston street to the Park street station of the Tremont street subway.

From the terminus of the East Boston tunnel in Court street under Court street to the surface tracks in Cambridge street.

To meet the cost of construction, the city is to sell 45-year bonds bearing interest at not to exceed 4 per cent.

BUFFALO, ROCHESTER & PITTSBURGH.—See annual report and comments thereon in another part of this issue.

CHICAGO CITY RAILWAY.—The company has sold to the Merchants Loan & Trust Co., Chicago, and White, Weld & Co., New York, an additional \$500,000 first mortgage 5 per cent. bonds, making the amount outstanding \$23,800,000.

CHICAGO & ALTON.—The directors on August 8 declared the regular semi-annual dividend of 2 per cent. on the prior lien stock. This action was postponed over a number of meetings

and it was thought that the directors had decided to pass the dividend. The dividend on the preferred stock had previously been passed.

COLUMBUS, DELAWARE & MARION.—The court at Marion, Ohio, has ordered the sale of this property under foreclosure of the mortgage for \$1,000,000 to the Western Reserve Trust Company of Cleveland, of the two mortgages of \$300,000 each to the Standard Trust Company of New York, and another of \$2,500,000 to the Merchants Trust Company of New York. This last named mortgage covers the other three mortgages.

EUSTIS RAILROAD.—This 15-mile 2-ft. gage road, running from Eustis Junction, on the Sandy River & Rangeley Lakes, to Berlin Mills lumber camps, has been ordered sold on August 24 under foreclosure of the mortgage securing bonds. The control of this company is held by the Maine Central. The upset price is \$40,000.

ILLINOIS TUNNEL CO. (Chicago).—The receivers have been authorized to issue \$1,000,000 6 per cent. one-year certificates dated July 1, 1911, to provide for the extension of the automatic telephone system.

MAINE CENTRAL.—The mortgage securing the recently authorized \$25,000,000 consolidated refunding bonds provides that the bonds shall bear interest not to exceed 5 per cent. and shall be dated July 1, 1911. The mortgage covers all of the present railway and equipment of the Maine Central and all additions acquired with the proceeds of the bonds, but does not cover leasehold interests, except the 999-year lease of the Androscoggin Railroad, nor does it cover property within the limits of the proposed Portland terminal. Of the bonds, \$5,543,000 are reserved to retire outstanding securities and \$2,000,000 are reserved to pay off the Maine Central five-year notes dated 1909. The remaining \$17,457,000 are issuable for any lawful purpose. See also Eustis Railroad.

MANITOULIN & NORTH SHORE.—See Algoma Eastern.

UNDERGROUND ELECTRIC OF LONDON.—This company has drawn for redemption on January 15, 1912, £868,700 (\$4,343,500) of its 4 1/2 per cent. bonds due 1933 but redeemable at par. In addition, £220,000 (\$1,100,000) additional bonds of this issue have been bought in the open market below par and will be redeemed on January 15. The total outstanding issue, including the bonds bought and the bonds drawn for redemption, amount to £2,818,700 (\$14,093,500). The bonds are dated 1908.

FOREIGN RAILWAY NOTES.

The Chilean government has granted concessions for private railways in this country covering 5,628 miles, of which about one-third is in operation. During 1910 concessions were granted covering 210 miles of railway, the greater portion of which are now under construction.

The provincial council at Bosnia-Herzegovina has presented a memorandum to the minister of finance at Vienna, Austria, dealing with the necessity of extending the railways of the province. The council proposes the construction of the following lines: (1) Banjaluka to Klek (or to Porto Tolero) on the Adriatic, estimated cost \$12,166,000; (2) Bugojno to Arzano on the Dalmatian frontier; (3) junction line between Sarajevo and some point on the Banjaluka-Klek (or Porto Tolero) line; (4) Bihac to Novi, on the Croatian frontier and the Banjaluka line; (5) Bosnian Gradiska, on the Croatian frontier to Banjaluka; (6) Brcka on the Slavonian frontier to Sarajevo, estimated cost \$6,691,000; (7) Bjelina, in the Northeast Bosnia to Tuzla, on the Brcka-Sarajevo line, estimated cost, \$1,421,000; (8) Samac, on the Croatian frontier, to Brcka, estimated cost \$608,000. Though laying stress on the importance of the proposed main line from Banjaluka to Klek, the council deals in greater detail with the Brcka-Sarajevo line as the easiest one to build and the one that would open up the richest districts. The council points out that the new line, costing \$6,667,000 would virtually take the place of the present line from Brod to Sarajevo, the conversion of which to the normal gage is estimated to cost \$15,816,000—more, in fact, than if it were entirely rebuilt.

ANNUAL REPORT

BUFFALO ROCHESTER & PITTSBURGH—TWENTY SIXTH ANNUAL REPORT.

The Directors of the Buffalo, Rochester and Pittsburgh Railway Company submit to the Stockholders the following report for the year ending June 30, 1911:

ROAD OPERATED.

	1911. MILES.	1910. MILES.	INCREASE. MILES.
Owned	352.10	346.39	5.71
Leased	93.83	93.83	...
Trackage rights	126.74	126.66	.08
Total length of road operated	572.67	566.88	5.79
Second track (owned)	111.13	102.57	8.56
Second track (trackage rights)	81.63	81.63	...
Sidings (owned and leased)	309.76	298.28	11.48
Total miles of all tracks, all steel rail	1,075.19	1,049.36	25.83

The increase in mileage of road operated is due to the purchase of the Silver Lake Railway, extending from Silver Springs, N. Y., to Perry, N. Y., a distance of 6.49 miles, and .08 miles of additional trackage rights at Lincoln Park, N. Y., taken into the accounts of the company during the year; less an adjustment of .78 miles at various points in the State of Pennsylvania caused by remeasurements.

The second track was increased by the construction of 8.49 miles between Newton, Pa., and Mt. Jewett, Pa., and .07 miles at Elk Run Junction, Pa.

Sidings were increased 11.48 miles.

INCOME.

	1911.	1910.	INCREASE OR DECREASE.
RAIL OPERATIONS:			
Operating revenues	\$9,134,402.03	\$8,936,116.96	\$198,285.07
Operating expenses	6,145,855.52	5,903,904.93	241,950.59
Net operating revenue	\$2,988,546.51	\$3,032,212.03	-\$43,665.52
OUTSIDE OPERATIONS:			
Revenues	\$18,868.52	\$17,064.21	\$1,804.31
Expenses	20,857.57	19,418.64	1,438.93
Net deficit	\$1,989.05	\$2,354.43	\$365.38
Total net revenue	\$2,986,557.46	\$3,029,857.60	-\$43,300.14
TAXES ACCRUED:			
Operating income	\$2,774,557.46	\$2,841,762.43	-\$67,204.97
OTHER INCOME	840,517.59	552,380.19	288,137.40
Gross corporate income	\$3,615,075.05	\$3,394,142.62	\$220,932.43
DEDUCTIONS FOR INTEREST AND RENTALS			
Rentals	1,905,798.00	1,866,769.16	39,028.84
Net corporate income	\$1,709,277.05	\$1,527,373.46	\$181,903.50
APPROPRIATIONS:			
Pension fund	\$10,069.42	\$12,696.54	-\$2,627.12
Special appropriations	371,500.00	315,000.00	56,500.00
TOTAL APPROPRIATIONS	\$381,569.42	\$327,696.54	\$53,872.88

Surplus available for dividends... \$1,327,707.63 \$1,199,676.92 \$128,030.71 Taxes increased 12.71% to \$212,000, as a result of higher assessments on Real Estate, and of higher taxes imposed on Capital Stock and Loans.

Other Income was increased \$288,137.40; of this amount \$259,424.18 was of Hire and Equipment, and the balance in Rents and Interest Accounts.

The increase in "Deductions for Interest and Rentals" is principally due to the fact that the account this year has been charged with the full annual interest on the 4 1/2% Consolidated Mortgage bonds issued during the latter half of the preceding year.

A special appropriation of \$371,500 was made from the Net Corporate Income. Of this amount, \$125,000 was paid into the Sinking Funds under Equipment Agreements Series A, B and C, for the purchase of new rolling stock; \$44,000 was used to retire a like amount of Equipment Bonds Series G, and \$202,500 represents one-half of the principal of Equipment Bonds Series D, E and F paid during the year, the other half being refunded by 4 1/2% bonds, issued under the terms of the Consolidated Mortgage, and held in the Treasury of the Company.

DIVIDENDS.

	1911.	1910.	INCREASE.
Dividends in cash were paid on:			
Preferred stock... \$6,000,000 6% \$360,000	6% \$360,000	6% \$360,000	\$52,500
Common stock... 10,500,000 4 1/2% 472,500	4% 420,000		\$52,500

Total \$16,500,000 \$832,500 \$780,000 \$52,500 Since the close of the fiscal year, your Board of Directors has declared a semi-annual dividend of three per cent. on the preferred stock and two and one-half per cent. on the common stock, both payable August 15, 1911.

CAPITAL STOCK.

There has been no change during the year in this account. The total outstanding Capital Stock of the Company amounts to \$16,500,000, and consists of \$6,000,000 preferred stock and of \$10,500,000 common stock.

FUNDED DEBT.

Under the terms of the Sinking Funds for the redemption of Equipment Bonds, \$449,000 bonds were retired, as follows: \$114,000 of Series D; \$115,000 of Series E; \$176,000 of Series F, and \$44,000 of Series G.

Your Company purchased the entire capital stock of the Silver Lake Railway Company, and on October 1, 1910, took possession of this railway extending from Silver Springs, N. Y., to Perry, N. Y., a distance of 6.49 miles. Articles of merger were filed with the Secretary of State of New York on September 29, 1910.

To pay for this property, \$117,000 Consolidated Mortgage 4 1/2% bonds were issued. There were also issued \$60,000 of these bonds to pay off the last mortgage outstanding on real estate belonging to the Company.

In accordance with the provisions of the Consolidated Mortgage of 1907, the Trustee delivered to the Company \$203,000 Consolidated Mortgage 4 1/2% Bonds, representing 50% of the Equipment Bonds, Series D, E and F, retired during the year. These bonds, added to those in the Treasury of the Company, make a total of \$912,000 held in reserve.

The net result is a decrease of \$332,000 in the bonded debt of the Company outstanding on June 30, 1911.

CONSTRUCTION.

The purchase of the Silver Lake Railway for \$120,000 was paid for by the issue of \$117,000 Consolidated Mortgage Bonds, as mentioned above.

In addition, Capital Account has been charged during the year with \$1,117,281.58 for additions and betterments to your property, as follows:

Improving bridges and culverts		\$38,666.52
Station improvements, Rochester, N. Y.		21,455.75
New station, Scottsville, N. Y.		4,063.76
New station, Springville, N. Y.		18,653.48
New office building, Du Bois, Pa.		27,384.67
Reservoir and pipe line, Ketner, Pa.		69,005.83
Reservoir and pipe line, Falls Creek, Pa.		82,904.46
Mechanical coal and ash handler, Lincoln Park, N. Y.		17,528.74
Mechanical coal and ash handler, Du Bois, Pa.		41,988.65
Creosoting plant, Bradford, Pa.		7,426.65
Increased weight of rail and fastenings		33,424.28
Sidings and yard extensions		21,000.88
Second track, Newton, Pa., to Mt. Jewett, Pa.		47,972.01
Jacksonville mine line		85,551.35
Lucerne mine line		17,760.46
Frances mine line		26,132.93
Automatic block signals		12,036.14
Coal trestles and docks, Genesee Dock, N. Y.		101,181.14
Other items		8,143.88
Total		\$1,117,281.58

The new double track between Newton, Pa., and Mt. Jewett, Pa., 8.49 miles in length, was completed and turned over to the Operating Department on December 29, 1910. The main line is now double-tracked from Ashford, N. Y., to Punxsutawney, Pa., a distance of 131.89 miles.

The following work referred to in last year's report, was completed:

Division office building at Du Bois, Pa.	
Mechanical coal and ash handlers at Du Bois, Pa., and Lincoln Park, N. Y.	

Creosoting plant at Bradford, Pa.

Station improvements at Rochester, N. Y.

A new brick and stone station was constructed at Springville, N. Y., two mine lines were opened to new coal operations, and important improvements made at Genesee Dock, N. Y.

The following work, now in progress, will be completed during the coming year:

Reservoirs and pipe lines at Ketner, Pa., and Falls Creek, Pa.

Double-track automatic block signals between Clarion Junction, Pa., and Falls Creek, Pa., a distance of 35 miles.

New station at Scottsville, N. Y.

Replacing various timber bridges, trestles and culverts in permanent form.

Jacksonville and Lucerne mine lines.

The unexpended balance, amounting to \$428,053.72, derived from the sale of 4 1/2% Consolidated Mortgage Bonds, issued last year, was applied to meet expenditures for additions and betterments this year.

EQUIPMENT.

Expenditures were made for new rolling stock as follows:	
Two passenger motor cars	\$17,658.70
One saddle tank locomotive	3,388.77
Sundry betterments, including re-classification or transfer of seventy-six freight train cars and work equipment cars	63,108.45
	\$114,155.92

There was credited for Equipment sold, transferred or destroyed, the following book values, charged in part to Operating Expenses, and the balance, representing the depreciation since June 30, 1907, charged to "Reserve for Accrued Depreciation":

Seventeen locomotives

\$100,358.97

Six hundred and seven freight train cars

220,692.06

Fourteen work equipment cars

5,838.95

326,889.98

Making a net decrease of

\$212,734.06

All cars in freight service are now provided with automatic couplers and 98.86 per cent. of the cars are equipped with air brakes.

The total carrying capacity of cars in freight service now amounts to 607,519 tons, a decrease of 14,218 tons from last year. The average carrying capacity or efficiency of each freight car increased .55 tons, being 38.85 tons as against 38.30 tons last year.

The book value of rolling stock sold, transferred or destroyed, is credited to "Additions and Betterments—Equipment," and Operating Expenses is debited (less the salvage carried to material account, and less the amount previously written off for depreciation, charged against the "Reserve for Accrued Depreciation").

When rolling stock is purchased or rebuilt, the cost is charged direct to "Additions and Betterments—Equipment" account.

The reserve for accrued depreciation of equipment on June 30, 1911, amounted to \$1,229,797.92.

PASSENGER REVENUES.

The average rate received per passenger per mile decreased .003 cents, being 2.060 cents as compared with 2.063 cents a year ago.

The average distance each passenger was carried decreased 1.64 miles, being 28.48 miles, against 30.12 miles last year.

Passengers carried in 1911

1,817,038

Passengers carried in 1910

1,586,838

An increase of 14.51 per cent., or

280,200

Passengers carried one mile in 1911

51,751,214

Passengers carried one mile in 1910

47,802,085

An increase of 8.26 per cent., or

3,949,129

The result is a gain of \$79,613.69 in gross passenger revenues.

FREIGHT REVENUES.

The average rate received per ton per mile increased .06 mills, being 4.87 mills, as compared with 4.81 mills last year.

The average distance each ton was hauled increased .02 miles, being 154.67 miles, against 154.65 miles a year ago.

In spite of the prevailing depression in the iron and steel trade, the revenue tonnage moved was the largest in the history of the company:

	1911.	1910.	INCREASE.	DECREASE.
Bituminous coal	6,950,767	6,526,087	424,680	
Coke	627,206	578,380	48,826	
Iron ore	243,610	558,550		314,940
Pig and bloom iron	188,830	209,032		20,202
Other freight	2,271,838	2,298,434		26,596
Total	10,282,251	10,170,483		

An increase of 1.10 per cent., or.....	111,768
Tons moved one mile in 1911.....	1,590,341,454
Tons moved one mile in 1910.....	1,572,897,173

An increase of 1.11 per cent., or..... 17,444,281
The result for the year is a gain of \$185,919.23 in gross freight revenue.

EXPENSES.

Operating Expenses increased \$241,950.59, or 4.10 per cent. Maintenance of Way and Structures shows a decrease due to the mild winter and to the extraordinary charges made last year for the replacement of bridges and other structures; the decrease in Maintenance of Equipment is due to the lower cost of maintenance of modern rolling stock.

The other operating expense accounts show increases. The most important is in Transportation, caused principally by the advances made in the wages of employees and higher cost of supplies.

The operating ratio increased 1.21 per cent., being 67.28 per cent., against 66.07 per cent. last year.

The percentage of each group of operating expenses to gross earnings for the past four years, is as follows: 1911. 1910. 1909. 1908.
Maintenance of way..... 12.57 13.65 10.72 12.71
Maintenance of equipment..... 19.35 20.78 21.45 23.01
Traffic 1.44 1.35 1.41 1.28
Transportation 32.11 28.55 29.22 32.39
General 1.81 1.74 2.25 2.10

Total 67.28 66.07 65.05 71.49
The Company's roadbed, tracks and equipment have been greatly improved, and are now in better condition than ever before.

The average cost per ton per mile is .07 mills, being .07 mills more than last year.

The average number of revenue tons carried one mile per revenue freight train mile, excluding the mileage of helping engines, decreased 2.87 tons, being 634.69 tons, against 637.56 tons a year ago.

The average number of revenue tons carried one mile per revenue freight engine mile, including the mileage of helping engines, increased 10 tons, being 430, against 420 a year ago.

The averages for the past ten years are as follows:

YEAR.	TRAIN LOAD.	ENGINE LOAD.
1902.....	424	353
1903.....	441	364
1904.....	439	357
1905.....	507	374
1906.....	525	418
1907.....	543	435
*1908.....	530	371
*1909.....	597	400
*1910.....	638	420
*1911.....	635	430

*The figures from 1908 to date are based on the Interstate Commerce Commission's classification of locomotive and train mileage.

The average number of revenue passengers carried one mile per revenue passenger train mile is 40, the same as in the preceding year.

The non-revenue traffic, not included in any of the other figures of this report, is as follows:

	1911.	1910.
Number of passengers.....	262,445	244,563
Number of passengers carried one mile.....	10,285,321	9,640,295
Number of tons.....	911,360	966,968
Number of tons carried one mile.....	73,811,354	75,856,798

FIRE INSURANCE FUND.

The assets in this fund were increased \$23,425.73 during the year, and now amount to \$216,200.85 in interest-bearing securities.

PENSION FUND.

The assets in this fund, created July 1, 1903, were increased \$19,284.16 during the year, and now amount to \$165,233.86 in interest-bearing securities and cash.

There were forty-six pensioners upon the roll on June 30, 1911, a net increase of thirteen during the year.

GENERAL REMARKS.

The Ontario Car Ferry Company, Limited, paid a dividend of 5 per cent. for the year ending December 31, 1910. The sum of \$12,485 received on the \$249,700 of this company's stock was credited to "other income" account.

A corporation was organized, with a capital of \$50,000, to acquire and hold real estate. The sum of \$49,600 paid for the stock subscribed to by your company has been charged to "investment account." In addition, temporary advances of \$240,000 were made to this new corporation to further carry out the purposes of its organization.

Mr. Adrian Iselin, Jr., president, having declined re-election at the last organization meeting of the directors, Mr. William T. Noonan, vice-president, was elected president, and Mr. Adrian Iselin, Jr., vice-president.

The board records the death, on December 22, 1910, of Mr. A. Lanfear Norrie, who served as director of the company from November, 1906.

The acknowledgments of the board are renewed to the officers and employees for their faithful and efficient services.

Statements and statistics of the operation of your road for the year are submitted herewith.—By order of the board,

WILLIAM T. NOONAN,
President.

ROCHESTER, N. Y. July 29, 1911.

INCOME ACCOUNT.

OPERATING REVENUES.

RAIL OPERATIONS.	1911.	1910.	Increase.	Decrease.
FREIGHT—				
Coal	\$5,025,847.56	\$4,661,660.27	\$364,187.29	
Coke	576,578.37	475,437.36	101,141.01	
Merchandise	2,145,752.58	2,425,161.65	.....	\$279,409.07
Total	\$7,748,178.51	\$7,562,259.28	\$185,919.23	
Passenger	1,065,983.42	986,369.73	79,613.69	
OTHER TRANSPORTATION—				
Excess baggage.....	9,922.55	10,218.36	.....	\$295.81
Mails	50,100.37	49,689.17	411.20	
Express	52,685.58	49,529.72	3,155.86	
Milk	13,733.01	14,615.69	.....	882.68
Switching	111,262.57	108,791.32	2,471.25	
Sundry sources.....	8,628.73	4,165.44	4,463.29	
Total	\$246,332.81	\$237,009.70	\$9,323.11	
OTHER OPERATIONS—				
Station and train privileges	4,064.47	4,120.75	.....	\$56.28
Car service.....	9,355.80	16,182.00	.....	6,826.20
Ganson St. Docks..	55,227.90	126,783.55	.....	71,555.65
Sundry sources.....	5,259.12	3,391.95	1,867.17	
Total	\$73,907.29	\$150,478.25	\$76,570.96

TOTAL OPERATING REVENUES	\$9,134,402.03	\$8,936,116.96	\$198,285.07
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OPERATING EXPENSES.

Maintenance of way and structures....	\$1,148,663.46	\$1,220,190.46	\$71,527.00
Maintenance of equipment	1,767,456.36	1,857,016.59	.....	89,560.23
Traffic expenses.....	131,403.06	120,168.82	\$11,234.24	
Transportation expenses.....	2,933,141.80	2,551,197.46	381,944.34	
General expenses.....	165,190.84	155,331.60	9,859.24	

TOTAL OPERATING EXPENSES	\$6,145,855.72	\$5,903,904.93	\$241,950.59
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NET OPERATING REVENUE	\$2,988,546.51	\$3,032,212.03	\$43,665.52
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OUTSIDE OPERATIONS—				
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Revenues	18,868.52	17,064.21	\$1,804.31
Expenses	20,857.57	19,418.64	1,438.93

Net deficit	\$1,989.05	\$2,354.43	\$365.38
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TOTAL NET REVENUE	\$2,986,557.46	\$3,029,857.60
TAXES ACCRUED.....	212,000.00	188,095.17	\$23,904.83

OPERATING INCOME	\$2,774,557.46	\$2,841,762.43
1911. 1910.			Increase. Decrease.

OTHER INCOME—				
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Rents—Hire of Equipment	570,635.14	311,210.96	\$259,424.18
Rent—Joint Facilities	142,182.25	129,269.27	12,912.98
Dividends on stocks owned	12,485.00	12,485.00	
Interest on securities, loans and accounts	102,735.91	86,204.60	16,531.31
Miscellaneous	12,479.29	13,210.36

TOTAL OTHER INCOME	\$840,517.59	\$552,380.19	\$288,137.40
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GROSS CORPORATE INCOME	\$3,615,075.05	\$3,394,142.62	\$220,932.43
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DEDUCTIONS FROM GROSS CORPORATE INCOME.			
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RENTS ACCRUED FOR LEASE OF OTHER ROADS—			
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Allegheny & Western Railway.....	\$272,000.00	\$272,000.00	
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Clearfield & Mahoning Railway.....	86,500.00	81,921.67	\$4,578.33
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Mahoning Valley Railroad	15,000.00	15,000.00	
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Total	\$373,500.00	\$368,921.67	\$4,578.33
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Rents—Joint Facilities	284,176.45	289,852.07
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"—Miscellaneous	16,510.15	18,306.67	1,796.52
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Total ..
